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Announcement of the Thirty-First

Summer Session 1922

July 8—August 18

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This announcement is intended to give detailed information to prospective students in the Summer Session of Cornell University.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

CALENDAR

SUMMER SESSION 1922

In order to get the full number of exercises announced for the Summer Session it is necessary that all work begin promptly on Monday morning, July 10. Students are urged, therefore, to reach Ithaca in time to be present at the first exercise in each class. If possible, they should register on Saturday, July 8; if not, they should register on Monday during the hours not occupied in class work.

July 8, Saturday,	8 a. m. to 5 p. m. Registration, Room A, Goldwin Smith Hall.
July 10, Monday,	Instruction begins at time and place announced under each course. Registration continued at office of Registrar, Morrill Hall.
July 10, Monday evening, 8 p.m.	Opening convocation, Bailey Hall.
July 11, Tuesday evening and following Tuesdays,	Organ recital, Sage Chapel.
July 12, Wednesday evening and following Wednesdays,	Departmental Lectures and Conferences.
July 13, Thursday evening and following Thursdays,	Piano Recital, Mr. E. R. Kroeger.
July 14, Friday, before 4 p.m.,	Last day for payment of fees at the Treasurer's Office, Morrill Hall.
July 16, Sunday, 11 a.m. and following Sundays,	Preaching in Sage Chapel.
July 16, Sunday evening and following Sundays,	Organ Recital, Bailey Hall.
July 17, Monday evening and following Mondays,	Lecture Course, Barnes Hall.
July 21, Friday evening,	Concert. Sophie Braslau, Contralto, Bailey Hall.
August 4, Friday evening,	Concert. Joseph Lhevinne, Pianist, Bailey Hall.
August 18, Friday,	Summer Session closes.

All public exercises in connection with the Summer Session are announced weekly in the University Calendar.

SUMMER SESSION 1922

OFFICERS

Livingston Farrand, A.B., A.M., M.D., LL.D., President of the University.
David Fletcher Hoy, M.S., Registrar of the University.

ADMINISTRATIVE BOARD OF THE SUMMER SESSION

James Edwin Creighton, Ph.D., LL.D., Dean of the Graduate School.
Dexter Simpson Kimball, M.E., Dean of the College of Engineering.
————— Dean of the College of Arts and Sciences.

Executive Committee

Robert Morris Ogden, Ph.D., Chairman.
Benton Sullivan Monroe, Ph.D., Secretary.

*STAFF OF INSTRUCTION

Joseph Quincy Adams, Ph.D., Litt. D. Professor of English	English
Ralph Roy Adams Assistant in Chemistry	Chemistry
Albert LeRoy Andrews, Ph.D. Assistant Professor of German	German
Dane Lewis Baldwin, M. A. Instructor in English	English
Carl Becker, B. Litt. Professor of Modern European History	History
Charles Clarence Bidwell, A.B., Ph.D. Assistant Professor of Physics	Physics
Homer Guy Bishop, B.S., M.S., M.A., Ph.D. Instructor in Psychology	Psychology
Thomas Roland Briggs, A.B., Ph.D. Assistant Professor of Physical Chemistry and Electro-Chemistry	Chemistry
Pierre Edouard Briquet, Licencié ès lettres Instructor in French and Italian, Vanderbilt University	French
Arthur Wesley Browne, B.S., M.S., Ph.D. Professor of Inorganic and Analytical Chemistry	Chemistry
Earle Nelson Burrows, C.E., M.C.E. Assistant Professor of Bridge Engineering	Structural Engineering
Harry Caplan, B.A., M.A., Ph.D. Instructor in Public Speaking	Public Speaking
Walter Buckingham Carver, Ph.B., Ph.D. Assistant Professor of Mathematics	Mathematics
Fred Albert Carlson, B.S., Ph.D. Instructor in Physical Geography	Geography
Jacob Roland Collins, B.S., M.S. Instructor in Physics	Physics

*The names of the instructors in the Summer School in Agriculture are given on page 44.

Lane Cooper, Ph.D. Professor of English	English
Morris Albert Copeland, A.B., Ph.D. Instructor in Economics	Economics
Robert B. Corey, B. Chem. Assistant in Chemistry	Chemistry
Ralph Thomas Kline Cornwell, B. Chem. Instructor in Chemistry	Chemistry
Clyde Firman Craig, A.B., Ph.D. Assistant Professor of Mathematics	Mathematics
James Edwin Creighton, A.B., Ph.D., LL.D. Sage Professor of Logic and Metaphysics, and Dean of the Graduate School	Philosophy
James White Crowell, A.B., A.M. Instructor in Spanish	Spanish
Albert Henri Cury, Licencié ès lettres Instructor in Romance Languages	French
Karl M. Dallenbach, A.B., A.M., Ph.D. Assistant Professor of Psychology	Psychology
Alexander M. Drummond, A.B., A.M. Professor of Public Speaking	Public Speaking
Charles Love Durham, M.A., Ph.D. Professor of Latin	Latin
Maude Lee Etheredge, M. D. Assistant Medical Adviser for Women	Hygiene
Albert B. Faust, Ph.D. Professor of German	German
Roy Marshall Fisher, A.B. Instructor in Physics	Physics
Frederick Ebell Fiske, A.B., Ph.D. Assistant Professor of English	English
Edgar Stevenson Furniss, Ph.D. Assistant Professor of Political Economy, Yale University	Economics
Jean M. Gelás Instructor in Physical Education, Hamilton College	Swimming
Roswell Clifton Gibbs, A.B., A.M., Ph.D. Professor of Physics	Physics
Arthur Ward Gilbert, B.S. Assistant in Education	Education
David Clinton Gillespie, Ph.D. Assistant Professor of Mathematics	Mathematics
Adrian G. Gould, M. D. Instructor in Hygiene and Assistant Medical Adviser	Hygiene
Francis Philip Gross, jr., A.B. Assistant in Chemistry	Chemistry
Othon Goepp Guerlac, Licencié ès lettres, Licencié en droit, World War Memorial Professor of the Romance Languages and Literatures	French

Clarence F. Hale, B.S., Ph.D. Professor of Physics, New York State College for Teachers	Education
Ernest James Hall, A.B. Instructor in Spanish, Yale University	Spanish
William A. Hammond, Ph.D. Professor of Philosophy, and Dean of the University Faculty	Philosophy
John William Hebel, A.B., A.M., Ph.D. Assistant Professor of English	English
Emily Hickman, Ph.D. Professor of History, Wells College	History
Fred G. Hoffherr, Bachelier ès Lettres Assistant in French, Columbia University	French
Louis Benjamin Hoisington, A.B., Ph.D. Assistant Professor of Psychology	Psychology
Wallie Abraham Hurwitz, Ph.D. Assistant Professor of Mathematics	Mathematics
James Mead Hyatt, A.B. Instructor in Physics	Physics
Clyde R. Jeffords, Ph.D. Chairman, Department of Latin, Newtown High School, Queens, New York City	Latin
Charles Byron Jolliffe, M.S. Instructor in Physics	Physics
Riverda Harding Jordan, A.B., A.M., Ph.D. Professor of Education	Education
Ralph Hayward Keniston, A.B., A.M., Ph.D. Professor of the Romance Languages and Literatures	Spanish
Earle Hesse Kennard, B.A., Ph.D. Assistant Professor of Physics	Physics
Ernest R. Kroeger Teacher of Music, St. Louis, Mo.	Music
Harold Talbot Lacey, B. Chem. Assistant in Chemistry	Chemistry
Harold Marshall Lufkin, A.B., S.T.B., M.I. Instructor in Mathematics	Mathematics
Gerald R. MacCarthy, B. A. Instructor in Geology, Williams College	Geology
Paul McCorkle, A.B. Instructor in Physics	Physics
Asa Emanuel McKinney, A.B., A.M. Instructor in Chemistry	Chemistry
James Frederick Mason, A.B., Ph.D. Professor of the Romance Languages and Literatures	French
Victor Elvert Monnett Associate Professor of Geology, University of Oklahoma	Geology
Benton Sullivan Monroe, A.B., A.M., Ph.D. Assistant Professor of English	English

David W. Moore

Lecture Assistant in Chemistry

Chemistry

David S. Morse, A.B., A.M.

Instructor in Mathematics

Mathematics

Guy Brooks Muchmore, A.B.

Assistant Professor of Public Speaking

Public Speaking

Melvin L. Nichols, B. Chem.

Instructor in Chemistry

Chemistry

Paul Allen Northrop, B.S.

Instructor in Physics

Physics

Clark Sutherland Northup, A.B., Ph.D.

Professor of English and Librarian of the Hart Memorial Library

English

Robert Morris Ogden, B.S., Ph.D.

Professor of Education

Education

Albert TenEyck Olmstead, A.B., A.M., Ph.D.

Professor of History and Curator of the Oriental History Museum,

University of Illinois

History

William Ridgley Orndorff, A.B., Ph.D.

Professor of Organic and Physiological Chemistry

Chemistry

Frederick William Owens, Ph.D.

Assistant Professor of Mathematics

Mathematics

Miles Albion Pond, Ph.B.

Assistant Professor of Civil Engineering

Descriptive Geometry

Marie E. Ponsolle, Brevet Supérieur,

Certificat pour l'enseignement dans les Ecoles Normales

Instructor in French, Wellesley College

French

Laurence Pumpelly, A.B., Ph.D.

Assistant Professor of the Romance Languages and Literatures

French

James T. Quarles

University Organist and Assistant Professor of Music

Music

Frank Walter Reed, M.A., Ph.D.

Instructor in Mathematics

Mathematics

Ernest William Rettger, A.B., Ph.D.

Assistant Professor of Applied Mechanics

Mechanics

Arthur John Rider, B.S., M.S.

Instructor in Chemistry

Chemistry

Guillermo Rivera, M.A.

Instructor in Spanish, Harvard University

Spanish

Rasmus S. Saby, Ph.D.

Assistant Professor of Political Science

Government

Francis Robert Sharpe, B.A., Ph.D.

Professor of Mathematics

Mathematics

St. George Leakin Sioussat, A.B., Ph.D.

Professor of American History, University of Pennsylvania

History

Dean Franklin Smiley, M. D.

Assistant Professor of Hygiene and Medical Adviser

Hygiene

Virgil Snyder, B.A., A.M., Ph.D.

Professor of Mathematics

Mathematics

Walter King Stone	
Assistant Professor of Architecture	Drawing
Edward Bradford Titchener, A.B., A.M., Ph.D., LL.D., D.Sc., Litt.D.	
Sage Professor of Psychology in the Graduate School, Lecturer in Psychology	Psychology
Clarence Ellsworth Townsend, M.E.	
Assistant Professor of Machine Design	Mechanical Drawing
Leonard Church Urquhart, C.E.	
Assistant Professor of Civil Engineering	Structural Engineering
William Emil Utterback, A.B.	
Instructor in Public, Dartmouth College	Public Speaking
Seth Wakeman, B.A., M.A.	
Instructor in Education	Education
Albert Edward Wells	
Professor of Machine Construction	Machine Shop Work
Frank Ernest Williams	
Assistant Professor of Geography and Industry, Wharton School, University of Pennsylvania	Geography
William Lloyd Garrison Williams, A.M., Ph.D.	
Instructor in Mathematics	Mathematics
Albert Benedict Wolfe, A.B., A.M., Ph.D.	
Professor of Economics and Sociology, University of Texas	Economics

OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited to specialists who wish to pursue their individual study; or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, museums, laboratories, and shops are open for use.

2. College students in Cornell or other universities who wish to make some scholastic use of the long vacation, especially those whose college studies may for one reason or another have been interrupted. In the case of graduates some of the courses offered may be counted toward an advanced degree. See the Announcement of the Graduate School for details regarding opportunities for advanced work and research during the summer.

Undergraduates may anticipate requirements and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 9 and 10.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

ADMISSION, ATTENDANCE, REGISTRATION

There are no examinations for admission to the Summer Session. For conditions of admission to courses in the Summer School in Agriculture, see page 46. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. **Admission to the class rooms is restricted to duly registered students.** Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Academic Credit for Work," page 9.

All students are required to register at the office of the Registrar. They may register on Saturday, July 8, between 8 a. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca on July 10 or later. Registration on July 8 is urged. Registration in advance of the dates here given is not required.

Class exercises begin at 8 a. m. Monday, July 10. Thereafter the Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon.

Students who wish credit for graduate work must register not only with the Registrar but also with the Dean of the Graduate School, Room 22, Morrill Hall.

TUITION FEE

The single tuition fee, with the exceptions noted below, for the entire Summer Session, whether one course or more is taken, is \$40. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal within five days from the first registration day, for reasons satisfactory to the Comptroller and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half of the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. **Admission to classes is restricted to duly registered students.**

For instruction in swimming and fencing an extra fee is charged. See p. 34.

Instruction in all subjects taught in the Summer School in Agriculture is provided by the State of New York, and is free to **students registered therein who have been residents of the State for at least one year.** See page 46. For all others the tuition is the same as for other work, \$40. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

Persons taking courses in the Summer School in Agriculture and in any department of the Summer Session must register in both the Summer School and the Summer Session, paying, however, only one tuition fee.

Any tuition fee or other fee may be changed by the Trustees to take effect at any time without previous notice.

LABORATORY FEES

Chemistry. A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

Physics. The fee in Physics is at the rate of \$1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

Geography and Geology. In course S 8 and in course S 9 a fee of \$1 must be paid in advance to the Treasurer to cover incidental expenses of the course.

Library Deposit. See under library, page 12.

ACADEMIC CREDIT FOR WORK

In the College of Arts and Sciences. The academic requirements for the degree of Bachelor of Arts are residence for eight terms (four years) and the completion of one hundred and twenty hours of elective work. During the first two years of his course the student must elect twenty-four of his hours under certain restrictions (the underclass requirements), and during his last two years he must elect twenty hours in some one department or group of related departments (the upperclass requirements.)

To obtain credit toward the Cornell degree by means of work done in Summer Sessions, a student must have previously satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. He may then obtain in any Summer Session credit for the number of hours he

passes. To obtain credit for a term of residence he must pass a total of at least twelve hours in two or more Summer Sessions, with a minimum of four or a maximum of eight in each Session. Credit for two terms of residence, but no more, may be secured in this way.

In Other Colleges of the University. The nature and amount of credit allowed in other colleges at Cornell for work in the Summer Session may be learned from the statements under the announcement of each course.

In the Graduate School. Graduate work at Cornell is not expressed in terms of courses or of hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may at once enter upon candidacy for an advanced degree if he is able to show that he has had adequate preliminary training in the subjects in which he proposes to work. The requirements for the degree do not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. They are rather based upon actual achievement in scholarship and research in the fields indicated by the major and minor subjects. The writing of a thesis and the passing of a special examination are also required. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered acceptable for a degree must be of advanced character in some field or department of knowledge. No residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1922 is July 13.

Students of the University Summer Session and the Summer School in Agriculture who have been admitted to candidacy for an advanced degree are required to pay the regular tuition of the session but are exempt from tuition and administration fees in the Graduate School. On registering for the first time as candidates, students who have not previously matriculated in Cornell University will be given matriculation without payment of the usual fee on presenting a certificate that they have paid the tuition charges for the current Summer Session.

Students registered in the Graduate School and excused from tuition in the Summer School in Agriculture as residents of New York State are charged on their first registration in the Graduate School a matriculation fee of \$10, and for each session an administration fee of \$6.25.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term, and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session is advised to write to the professor whose work

he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun. In this way, moreover, it may be possible to secure the advice and guidance of professors in fields of study of which no specific mention is made in the announcements. Not all departments formally offer graduate work.

In certain departments also an invitation is issued to scholars who are beyond the stage of regular graduate study to make use of the resources of the University in these fields for carrying on research.

CERTIFICATES FOR WORK DONE

Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 16, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from \$10 a week upwards. In some cases the cost has been reduced to \$9, but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as \$3 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or, if so stated, by the day.

A list of desirable rooms in private houses may be had on application after June 1. Students are cautioned against unauthorized rooming-house agents.

The price of table board runs from \$7 to \$10 in boarding houses. In cafeterias and restaurants, the average cost of meals amounts to about the same sum. Three cafeterias under the management of the University are easily accessible on the campus.

RESIDENTIAL HALLS, ROOMS, BOARD

1. **For Women.** The University has three residential halls for women in which board and rooms may be obtained during the Summer Session by registered students only.

Rooms in these buildings will be reserved in the order of application. Each application for a room must be accompanied by a deposit of \$5; otherwise the application will not be entered. If the room assigned is occupied by the applicant the amount of this deposit is held until the end of the session to cover the return of keys, damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit is refunded if the applicant gives formal notice to the manager on or before June 15 that she wishes to withdraw her application.

In Sage College, which accommodates 175, the charge for room, table board, and a specified amount of laundry, will be, for the session, from \$72 to \$84 according to the size and location of the room.

In Prudence Risley Hall, which accommodates 184, the charge will be from \$78 to \$84 according to the room occupied.

In both buildings this charge includes lodging Friday night, July 7 (not earlier), breakfast Saturday, July 8, and all meals to and including breakfast Saturday, August 19.

Members of the Summer Session who do not room in Sage College or Prudence Risley Hall may obtain table board at either. The charge is \$9 a week.

In Cascadilla Hall a furnished room may be had for the six weeks of the Summer Session at a cost of \$23 to \$29, this charge including a specified amount of laundry. This building is furnished like the others but has shower baths and not tubs. In this building the University maintains a dining-room and a cafeteria restaurant where meals may be had at reasonable rates.

Each of the residential halls is in charge of a warden, who is glad to know the students, to advise them in case of illness or other emergency, and to give them what information they may wish about the University, the town, and the community. The regulation of the social life of the students is in the hands of the wardens.

Undergraduate women students of Cornell and other colleges are expected to live in the Residential Halls or in other approved lodgings.

Rooms and board may be secured in private houses. A list of approved houses may be had on request after June 1. It is not safe to engage rooms in places not recommended by the University. For room plans and all information relative to these halls, and to other approved houses for women, apply to Mr. Thomas Tree, Manager of Residential Halls, Sage College, Ithaca, N. Y.

2. **For Men.** Rooms in Baker Court will be available for men students. For room plans and all information concerning Baker Court, apply to the University Treasurer, Ithaca, N. Y.

Checks for reservation of room, or in payment of board bills, should be drawn to the order of Cornell University.

Self-support. Students, both men and women, who may wish to earn a part of their expenses during the Summer Session, are invited to correspond in advance with Mr. Thomas Tree, Sage College, Ithaca, N. Y.

THE LIBRARIES

The University Library is open on week days from 8 a. m. to 10.30 p. m. In this building are the main library, containing about five hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for more than two hundred readers, and contains a selected library of over 8,000 volumes of reference works. Below stairs is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The Library of the College of Agriculture, in the basement of Stone Hall, is open on week days from 9 a. m. to 5. p. m., except Saturday, when it is closed at 1 p. m. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries

SAGE CHAPEL

Religious services are conducted in Sage Chapel throughout the academic year by eminent clergymen selected from the various religious denominations. There will be services in the Chapel on five Sundays during the Summer Session, July 16 to August 13, inclusive.

PHYSICAL EXAMINATIONS AND MEDICAL ADVICE

The medical advisers observe regular office hours at their respective offices in the gymnasium for men and in Sage College for women.

In cases of illness or indisposition which involve absence from classes even for one day, students are expected to report immediately either in person, by telephone, or by messenger to the medical advisers' office. For the convenience of the medical advisers such illness should be reported early in the day. Students who are indisposed but still able to attend classes should consult the medical advisers immediately in order that advice may be given and diagnosis of incipient diseases may be made promptly. Any student failing to report as soon as possible to the medical advisers any contagious or infectious disease will be regarded as guilty of a serious breach of discipline.

No charge is made for the services of the medical advisers.

A student may at any time be requested to withdraw from the University if, in the opinion of the University authorities, the condition of his health is such as to make it unwise for him to remain.

THE CORNELL INFIRMARY

The Cornell Infirmary is the former mansion of the late Henry Williams Sage, for many years chairman of the Board of Trustees of the University. At his death in 1897, his sons, Dean and William Henry Sage, endowed it and gave it to the University for a students' Infirmary as a memorial to their father. In 1912 a modern fireproof addition was erected with a capacity of sixty-two beds.

The Infirmary, which is in charge of an experienced superintendent, is thoroughly equipped in every way, and is open throughout the University year. It provides suitable rooms, food, and nursing for sick students. It has no medical staff; students employ their own physicians among practitioners in Ithaca or elsewhere.

Students in the University Summer Session and in the Summer School in Agriculture have all the privileges of admission to the Infirmary. They pay no fee in advance, but are liable to regular charges for services rendered.

LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class-room work there will be public lectures on Monday evenings.

There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Organ recitals will be given on Tuesday evenings in the Sage Chapel and on Sunday evenings in Bailey Hall.

A piano lecture-recital will be given each week by Mr. Ernest R. Kroeger.

Two University concerts by distinguished artists will be given during the Summer Session. Tickets for these concerts may be had at reduced rates by all students.

Wednesday evenings are devoted to the departmental conferences, which are open to all interested. Notice of these will be given from week to week.

In connection with the work of the several departments excursions are made to many points of interest. Some of these are open to all members of the Summer Session. Notable for their attractiveness are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES

Ithaca is reached by three railroads: the Lehigh Valley; the Delaware, Lackawanna, and Western; and the Central New York Southern. The Ithaca branch of the Lackawanna leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington, and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira. Trains on the Central New York Southern also connect with the New York Central at Auburn.

COURSES OF INSTRUCTION

See index, p. 71.

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

The word "hour" used in reference to University credit means the equivalent of one class exercise a week for a half-year or one semester. One hundred and twenty such "hours" are required of candidates for the A. B. degree.

G. S. =Goldwin Smith Hall.

CHEMISTRY

The courses announced below correspond entirely or in part with courses given during the regular sessions of the University. For regular students the requirements for admission to the various courses will be the same as during the year.

Teachers may be admitted to any course for which their general training or experience may be considered to prepare them. Every effort will be made to meet the individual needs of teachers by arranging and modifying the work as far as possible so as to fulfill the particular requirements in each case.

S 101. Introductory Inorganic Chemistry. a. Lectures, daily except Sat., 12. Rockefeller. Professor BROWNE and Mr. MOORE. The lectures deal with the fundamental theories and laws of chemistry, and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8-12, and T Th F, 9-12. Morse Hall. Mr. McKINNEY and Mr. COREY. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course special attention will be given to the methods of laboratory instruction, quantitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Morse C. Mr. McKINNEY. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems.

Credit for a, b, and c, six hours.

S 205. Introductory Qualitative Analysis. Lectures and recitations, daily except Sat., 8. Morse A. Laboratory, daily except Sat., 1.30-4.30, and M W F, 9-12. Mr. RIDER and Mr. ADAMS. Credit, one to six hours.

This course comprises (1) a study in class room and laboratory of the methods for detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course S 210; and (2) a comparative study in the laboratory of different methods of detecting and separating the bases.

S 210. Introductory Qualitative Analysis. Shorter Course. Lectures, M W F, 11. Morse C. Laboratory, daily except Sat., 1.30-4.30. Mr. RIDER and Mr. ADAMS. Credit, three hours. An elementary course for those who have had the equivalent of course S 101. A study in laboratory and class room of the methods of detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the students. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work.

S 220. Introductory Quantitative Analysis. Lectures, recitations, and laboratory practice. Credit, six hours. Lectures, daily except Sat., 8. Morse C. Laboratory, daily except Sat., 9-1. Mr. NICHOLS and Mr. GROSS.

The preparation and standardization of various volumetric solutions and their use in analyzing a variety of substances; gravimetric methods; stoichiometry.

S 225. Introductory Quantitative Analysis. Shorter course. Lectures and laboratory practice. Credit, three hours. Lectures, T Th, 11, Morse C. Laboratory, M W F, 8-11. Mr. NICHOLS and Mr. GROSS.

The preparation and use of volumetric solutions and work in elementary gravimetric analysis.

S 230. Advanced Quantitative Analysis. Recitations and laboratory practice. Credit, two to four hours. Prerequisite course 220. Laboratory, daily except Sat., 9-1. Recitation at hours to be arranged. Mr. NICHOLS and Mr. GROSS.

Gravimetric, volumetric, and electrolytic methods of analysis, and methods of combustion analysis; analysis of iron and steel, alloys, special steels, slags, coal and coke, cement and cement materials, and ores of copper, lead, zinc, mercury, manganese, tin, tungsten, chromium, etc.

S 305. Introductory Organic Chemistry.

A. Aliphatic Compounds. Lectures and written reviews. Daily, 9. Morse 119. Credit, three hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

B. Aromatic Compounds. Lectures and written reviews. Daily, 8. Morse B. Credit, three hours. Open to those who have had or who are taking S 305 A. Mr. CORNWELL and Mr. LACEY.

The lectures discuss systematically the more important compounds of carbon, their occurrence, methods of preparation, reactions, relations, and uses.

S 310. Introductory Organic Chemistry.

A. Aliphatic Compounds. Laboratory practice and oral reviews. Credit, one to three hours. Open to those who have had or are taking S 305 A. Hours to be arranged. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

B. Aromatic Compounds. Laboratory practice and oral reviews. Credit, one to three hours. Open to those who have had or are taking S 305 B and S 310 A. Hours to be arranged. Mr. CORNWELL and Mr. LACEY.

The student prepares a large number of typical compounds of carbon, and familiarizes himself with their properties, reactions, and relations. It is recommended that S 305 A and S 310 A be taken in one summer, and that S 305 B and S 310 B be taken in the following summer. In exceptional cases both may be taken together by special permission.

S 320. Advanced Organic Chemistry. Laboratory practice at hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

S 330. The Coal Tar Dyestuffs. Laboratory practice. Credit, two to four hours. Open to those who have had course 315. Professor ORNDORFF and Mr. CORNWELL. Hours to be arranged.

Various intermediate products used in the preparation of dyes are made and from these, representatives of the different groups of dyestuffs are prepared and studied.

S 340. Methods of Organic Analysis. Laboratory practice, with occasional lectures. Hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

S 375. Organic Chemistry. Shorter Course. Aliphatic and aromatic compounds. Lectures and recitations. Daily, 8, Morse B; daily, 9, Morse 119, during the first three weeks of the session, and 9, only, during the remainder of the session. Laboratory practice at hours to be arranged. Credit, four to six hours. Professor ORNDORFF, Mr. CORNWELL, and Mr. LACEY.

The lectures and recitations of this course include all of those of Course S 305 A, and the first half of those of Course S 305 B. Course S 375 presupposes a knowledge of elementary chemistry, and is designed more particularly for students registered in the Colleges of Medicine and Agriculture.

S 405. Introductory Physical Chemistry.

A. Lectures, daily, 8, Morse. Credit three hours. Assistant Professor BRIGGS and Mr. POLLARD. A systematic presentation of modern chemical theory. The subject matter includes: atomic and molecular theory; gases, liquids, and solids; the theory of solution; colloid chemistry and adsorption; reaction velocity, catalysis, and equilibrium in homogeneous systems; application of physicochemical principles to actual practice.

B. Lectures, daily, 9, Morse. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. A continuation of Part A. The subject matter includes the phase rule and its applications; thermochemistry; electrochemistry; photochemistry; application of the principles of physical chemistry to actual practice.

S 410. Physical Chemistry Laboratory. A. Laboratory practice, daily except Sat., 8-1. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. Open to those only who have taken or are taking Course S 405 A or its equivalent. With the data obtained in the laboratory as a basis, detailed reports are written covering each of the following topics: calibration of volume-measuring apparatus; molecular weight determination by vapor density, boiling point, and freezing point methods; vapor pressure; viscosity; distillation of liquid mixtures.

B. Laboratory practice, daily except Sat., 8-1. Credit, three hours. Assistant Professor BRIGGS and Mr. POLLARD. Open to those only who have taken or

are taking Course S 405 B or its equivalent. The course is a continuation of Part A. The following topics are considered: dissociation; solubility; reactions; reaction velocity and catalysis; indicators; thermochemistry; diffusion; colloids and adsorption; photochemical reactions; phase rule studies of inversion points: solid-liquid, liquid-liquid compounds.

S 465. Laboratory Practice in Physical Chemistry. Credit, one to three hours. Laboratory periods to be arranged. Assistant Professor BRIGGS and Mr. POLLARD.

This course is designed to afford opportunity for special laboratory practice in physical chemistry, colloid chemistry, or electrochemistry.

S 195, S 295, S 395, S 495. Research. Credit, one to six hours. Senior chemists, and others by special permission, may elect research in the fields of Inorganic, Analytical, Organic, or Physical Chemistry under the direction of some member of the staff of instruction.

For courses in agricultural chemistry see pages 49, 50 of this announcement.

Teachers' Course in Physical Science. Daily except Sat., 10. Rockefeller C. Credit, two hours. Professor HALE. See p. 21.

DRAWING AND COLOR-WORK

S 3. Mechanical Drawing for Secondary Schools. M W F, 8-11, and daily except Sat., 2-5. East Sibley 206. Assistant Professor TOWNSEND.

This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course.

Students should be provided with a set of drawing instruments, an architect's scale, a 30°-60° and a 45° triangle.

S 4. Mechanical Drawing. M W F, 8-11, and daily except Sat., 2-5. East Sibley 206. Assistant Professor TOWNSEND.

A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, convention, working drawings.

S 7. Color from Still Life. Daily except Sat., 8-10. Franklin. Assistant Professor STONE.

Instruction will be given in one or more of the following media: oil, watercolor, pastel.

S 8. Outdoor Sketching. Daily except Sat., 2-4. Franklin. Assistant Professor STONE.

Landscape painting and drawing in oil, watercolor, pastel, charcoal, and pencil.

DESCRIPTIVE GEOMETRY

S 10. Descriptive Geometry. Lectures, daily except Sat., 9. Recitations and drawing, daily except Sat., 10-12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as that given in the regular C. E.

course 1, and the student will receive four credit hours if he takes the whole course. A three-hour course that does not include shades and shadows and perspective, and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2-5 p. m. if there are students enough to make up an extra section. The morning and afternoon sessions make it possible to readjust the schedule so as to accommodate nearly all who may wish to take either course.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Course S 1 covers the subject matter usually included under elementary economics. For Cornell students Course S 1 satisfies the Economics requirement in the College of Engineering and will also serve in lieu of Course 51 as a prerequisite for admission to various advanced courses in Economics. Graduate students wishing to pursue special investigations will be afforded assistance by members of the Summer Session staff of instruction, and by other members of the Department of Economics of the University who may be in residence in Ithaca during the summer.

S 1. Principles of Economics. Twice daily except Sat., 10 and 11. G. S. A. Credit, four hours. Dr. COPELAND.

A general introduction to economics, covering the fundamental principles of value and the distribution of wealth, together with the elements of money and banking.

S 2. Labor Problems. Daily except Sat., 8. G. S. 242. Assistant Professor FURNISS.

A study of the conditions of labor as affected by the industrial development of modern society. Especial attention is given to the aims and tactics of organized labor; the types and programs of the labor unions; the legal status of the union program; and the effect of the labor movement on social welfare.

S 3. Industrial History. Daily except Sat., 9. G. S. 242. Assistant Professor FURNISS.

A survey of the evolution of industry from the Industrial Revolution to the present day; the development of modern forms of organization and the effect of industrial changes on the welfare of society.

S 4. Elementary Sociology. Daily except Sat., 10. G. S. 124. Professor WOLFE.

An outline introduction to some of the more important concepts and principles of contemporary sociological thought. Mainly a discussion course. Text, Ross, *Principles of Sociology*.

S 5. Social Points of View. Daily except Sat., 11. G. S. 124. Professor WOLFE.

A critical analysis of certain contrasting and opposed attitudes of signal importance in social organization and progress. Conservation and radicalism; individualism and the social point of view; class attitudes and democracy; popular versus scientific attitudes and methods. Lectures and discussions.

EDUCATION

Courses S 1, S 2, S 3, and S 4, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Department of Education will hold an official examination for such candidates at Ithaca August on 17 and 18.

Under certain conditions teachers may waive the state examination by completing an approved course of study in the Summer Session. Information regarding details of such a course may be had by consulting Professor R. H. JORDAN, Goldwin Smith Hall 121, either in person or by letter.

S 1. Educational Psychology. Daily except Sat., 12. G. S. 256. Credit, two hours. Professor OGDEN.

A study of the learning process and its application to educational theory and practice; the original nature of man, reflex action and instinct; the acquisition of habits; attention, memory, association, and thinking; fatigue, individual differences, and social co-operation. The textbook used in this course will be Gordon's *Educational Psychology* supplemented by Ogden's *Introduction to General Psychology*.

S 2. Principles of Education. Daily except Sat., 8. G. S. 256. Credit, two hours. Professor JORDAN.

A study of education from the sociological standpoint; the biological and psychological bases; the problem of aim; formal discipline; social and personal objectives; the studies and their functions; the administrative curriculum; especial reference is made throughout to secondary education.

Text: Inglis, *Principles of Secondary Education*.

S 3. History of Education. Lectures, recitations, and prescribed readings. Daily except Sat. 11. G. S. 256. Credit, two hours. Mr. WAKEMAN.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development. Throughout the course, therefore, attempt will be made not only to outline the problems and their solutions, but to correlate education with the life and the social, psychological, and economic conditions of the times. Only such theories and practices as later proved themselves influential will be considered.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teachers' Certificate; education in primitive and barbaric societies; Greek and Roman education; the rise of the school as an institution; scholasticism, humanism, and realism; the rise of science; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

Textbook: Hart, *Democracy in Education*.

S 4. Secondary Education. Daily except Sat., 10. G. S. 256. Credit, two hours. Professor JORDAN.

A study of the principles underlying teaching and administration in the secondary school; methods of class instruction and problems of supervision; interest and effort; questioning; lesson assignment; lesson plans; class and school management; supervised study. The course will be adapted to the needs and interests of the class.

Textbook: Colvin, *An Introduction to High School Teaching*.

S 7. Mental Measurements. Lectures, prescribed readings, and laboratory. Daily except Sat., 9. G. S. 256. Mr. WAKEMAN. Laboratory, T Th, 2-4.30. Mr. GILBERT. G. S. 248. Credit, three hours.

The first half of this course furnishes a general introduction to the psychology and practice of mental tests. The lectures will deal with the historical development of tests; the principles underlying their formation and application; the single tests and the test systems; a detailed study of the principles and use of the Stanford Revision of the Binet-Simon Scale; a brief consideration of the measures of central tendency, variability, and correlation; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.). The laboratory work is intended to give practice in administering tests, both to individuals and to groups.

The second half of the course will consider the use of the tests in schools for the diagnosis of defective and exceptional abilities; the causes, frequency, and consequences of mental deficiency; the social and educational treatment of defective, delinquent, retarded, superior, and psychopathic children.

Textbooks: Terman, *The Measurement of Intelligence*. Woodrow, *Brightness and Dullness in Children*.

Laboratory Manual: Whipple, *Manual of Mental and Physical Tests*, Vol. I.

S 9. Advanced Work in Education. Hours and credits to be arranged. G. S. 248. Professor OGDEN and the other members of the staff.

As a prerequisite for this course one of the courses S 2, S 3, or S 7, or an equivalent, is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice of an advanced grade. A seminary will be held if application is made by a sufficient number of advanced students.

TEACHERS' COURSES IN HIGH SCHOOL SUBJECTS

The following courses are offered for teachers desiring to study problems of instruction in different high school subjects. The courses are planned also to meet the requirements of the New York State Department of Education in the issuance of the College Graduate Life Certificate.

S 10. Teachers' Course in Physical Science. Daily except Sat., 10. Rockefeller C. Credit, two hours. Professor HALE.

Lectures, discussions, and conferences concerning the teaching of physics and chemistry in the secondary schools. In connection with this course opportunity will be afforded for practice in performing class-room demonstrations.

S 11. Teachers' Course in General Science. Daily except Sat., 11. Rockefeller C. Credit, two hours. Professor HALE.

A discussion through lectures and conferences of the purposes, scope, and administration of a course in general science as a part of the curriculum of the secondary schools.

Teachers' Course in English. See English S 5, p 22.

Teachers' Course in History. See History S 17, p 30.

Teachers' Courses in Latin. See Latin S 1 and S 2, p 31.

Teachers' Courses in Romance Languages. See French S 30, p 41. and Spanish S 30, p 42.

The attention of teachers is also called to the courses in Physical Education (p. 56) and in Rural Education (p. 65).

TRAINING COURSE FOR PSYCHOLOGICAL EXAMINERS

By recent legislative enactment of the State of New York, special classes for defective children must be formed whenever ten or more such cases are found in any school district. A similar law is operative in New Jersey, and like requirements are being made in other states. Not only is there a considerable consequent demand for teachers trained in the examination and instruction of defectives, but with the increasing recognition of the extent and importance of individual differences in endowment, there is increasing recognition of the usefulness of familiarity with the methods and interpretation of psychological examinations, not only for the mentally backward and subnormal, but also for the normal and supernormal, and in other fields than that of education.

To assist in meeting these various needs, the departments of Education and Psychology call special attention to courses in Introductory, Experimental, and Educational Psychology, and to the course in Mental Measurements. The latter has been expanded to give a thorough training in administration of tests, and in the evaluation and application of results. Students who wish to enter this course with a view to educational and field service, are advised to register for such additional courses in Psychology as may be helpful in providing an adequate understanding of psychological principles and methods of investigation. Advice in the selection of courses with regard to the individual needs of the student may be had by consulting Professor R. M. OGDEN, Goldwin Smith Hall 246, either in person or by letter.

ENGLISH

Courses S 1 and S 2 taken together will be considered the equivalent of the first term of course 1 in the regular University session.

Courses in brackets are not given in the summer of 1922, but may be expected in the summer of 1923.

S 1. Composition. Daily except Sat., 8. G. S. 177. Credit, two hours. Mr. BALDWIN.

A practical drill intended for those who lack proficiency in writing; discussion of the elements and forms of discourse; frequent exercises, mainly expository; personal conferences at hours to be appointed.

S 2. Introductory Course in Literature. Daily except Sat., 9. G. S. 164. Credit, two hours. Assistant Professor FISKE.

Primarily a study of five of The Idylls of the King: The Coming of Arthur, Lancelot and Elaine, The Holy Grail, Guinevere, and the Passing of Arthur; and of the first, fifth, sixth, and seventh books of The Ring and the Book; and supplementary reading in Tennyson and Browning.

S 4. Advanced Composition. Daily except Sat., 11. G. S. 164. Credit, two hours. Assistant Professor FISKE.

The planning, writing and criticism of essays and of other exercises in composition, accompanied by a study of general principles of writing and of questions of English usage. The work of the class will be supplemented by personal conferences. Open only to students who have had course S 1 or its equivalent.

S 5. Teachers' Course. Daily except Sat., 10. G. S. 156. Credit, two hours. Professor NORTUP.

Lectures, readings, reports, and discussions. Designed for those who are teaching or who expect to teach English in schools. The organization of the high school course in English; methods of treating the works named by the Conference on Uniform Entrance Requirements in English; the teaching of literature in general; supplementary reading for pupils and teacher; the use of the school library and the public library; stage productions; the place of language and grammar in the high school; problems of oral and written composition; the relation of composition to literature and to other subjects in the curriculum.

S 6. **Nineteenth Century Poetry.** Daily except Sat., 8. G. S. 160. Credit, two hours. Assistant Professor HEBEL.

A study of the poetry of Wordsworth and of Coleridge.

[S 7. **Nineteenth Century Poetry.** Daily except Sat., 11, G. S. 156. Credit, two hours.

A study and discussion of the most important poems of Byron, Shelley, and Keats.]

S 8. **Modern Prose.** Daily except Sat., 11. G. S. 156. Credit, two hours. Mr. BALDWIN.

The nature of prose, and the principles of structure and style; essays and extracts from the works of Stevenson, Pater, Ruskin, and Newman, or other nineteenth-century English authors.

S 9. **History of the English Drama.** Daily except Sat., 10. G. S. 160. Credit, two hours. Professor ADAMS.

An historical survey of the English drama from its origin to the close of the Elizabethan period, with a reading of typical plays.

S 10. **Shakespeare.** Daily except Sat., 9. G. S. 156. Credit, two hours. Professor ADAMS.

A study of a limited number of plays, including Hamlet and Macbeth, required by the College Entrance Examination Board—with stress upon the art of Shakespeare as a playwright.

S 11. **American Literature.** Daily except Sat., 12. G. S. 156. Credit, two hours. Professor NORTHUP.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, and Emerson. Text: Page, *Chief American Poets*.

[S 12. **Victorian Literature.** Daily except Sat., 12. G. S. 164. Credit, two hours.

Lectures, readings, reports, and discussions of the leading characteristics and literary tendencies of the nineteenth century; the literary reflection of social changes; the relation of science and politics to literature; illustrative readings in the works of Tennyson, Browning, Arnold, Clough, Swinburne, Morris, Rossetti, with a glance at the novelists and essayists.

This course does not cover the ground of S 2.]

S 13. **The Literary Study of the Ancient Classics.** Daily except Sat., 10. G. S. 164. Credit, two hours. Professor COOPER.

A course designed for students of modern literature and those who have no ready access to classical writers in the original tongues, but intended to be useful also to teachers of Greek and Latin in the schools. Not open to Cornell undergraduates. Single works of a few authors (as Sophocles, Plato, and Aristotle)

will be read in the translations best suited to modern readers—as far as possible, in translations of literary merit. Some attention will be paid to the teaching of the *Iliad*, the *Odyssey*, and the *Aeneid* in the schools. One hour in the week will be given to the oral interpretation of a work or author to be selected by the class.

S 14. Modern Drama. Introductory Course. Daily except Sat., 11. G. S. 160. Credit, two hours. Assistant Professor HEBEL.

Reading and discussion of characteristic plays of some of the more important recent dramatists; consideration of the modern theatre; current theories of drama.

[**S 15. Dramatic Structure.** Daily except Sat., 10. G. S. 160. Credit, two hours.

An advanced course designed for those who have completed two or more college courses in English, or whose reading serves as an equivalent for freshman and sophomore work.

A study of the principles of dramatic construction, based upon Greek, Elizabethan, and modern drama. Reading of about thirty representative plays.]

S 16. The English Language. Daily except Sat., 9. G. S. 162. Credit, two hours. Assistant Professor MONROE.

A study of essential features in the growth and development of the mother-tongue. Among the topics considered are: language and grammar in general; some misconceptions about the life of language; the relationships of English; phonetics, with practical exercises; the English vocabulary; inflections; native resources and foreign influences; modern English grammar; syntax; disputed usages; the bearing of historical grammar on present forms and usages, spoken and written.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

[**S 17. Recent English Poetry.** Daily except Sat., 10. G. S. 164. Credit, two hours.

A critical study of the poetical work of Robert Bridges, Rudyard Kipling, W. B. Yeats, Thomas Hardy, Sir William Watson, Sir Henry Newbolt, John Masefield, Alfred Noyes, W. W. Gibson, and Francis Ledwidge. Consideration of other contemporary work, including the "new poetry" and the poetry of the War.]

S 18. Old English. Daily except Sat., 11. G. S. 162. Credit, two hours. Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree. The time of meeting may be changed to suit the convenience of the class.

S 19. Methods and Aims in the Study of Literature. Daily except Sat., 12. G. S. 164. Credit, two hours. Professor COOPER.

A course for advanced students. Open to Cornell undergraduates only by special permission. The views of experts on the study of literature and related subjects, and the methods of poets and prose writers themselves (as Shakespeare,

Spenser, Milton, Wordsworth, Arnold, and Ruskin) in literary study or teaching. Reports and discussions. One hour in the week will be given to a discussion of problems selected after conference with the class, or to the oral interpretation of some writer thus selected.

Problems and Methods in Research. For graduates only. Hours to be arranged. G. S. 171. Professor COOPER.

The work will be adapted to the special needs and aims of the graduate students who apply. Application may be made to the instructor in advance by letter, or, otherwise, as soon as possible after the opening of the Summer Session.

Middle English Literature. For graduates only. Hours and room to be arranged. Professor NORTHUP.

A study of some of the leading tendencies in late Middle English literature. The special topic for this session will be the life and works of Chaucer.

Elizabethan Literature. For graduates only. Hours and room to be arranged. Professor ADAMS.

A study of non-dramatic authors from the beginning of the Renaissance to the death of Elizabeth.

GEOGRAPHY AND GEOLOGY

Illustrated Special Announcement. A special announcement with many photographic illustrations showing typical features of the Cornell environment and the work of excursion classes in the field is published for the department and may be had post-free on application to the Secretary of the Summer Session. The text of this special announcement is devoted largely to an explanation of the advantages of the Cornell region for outdoor study of both geography and geology. As the special announcement was issued in 1914, it should be noted that there are changes in the courses for 1922 as listed in the following paragraphs.

Equipment and Purpose. The lecture rooms and laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical and industrial geography, and in the elements of geology; also educational methods in geography.

The environs of Cornell University are rich in phenomena of geographic and geologic interest. Field excursions, consequently, are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for instruction. This material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit ($\frac{1}{2}$ unit) in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses S₁, S 8, and S 10.

LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

S 1. **Physical Geography.** Daily except Sat., 9. Lecture room, McGraw Hall, first floor, south end. Dr. CARLSON. Credit, two hours.

An introductory course in physical geography including the continents and the atmosphere; theories of the origin of the earth; its motions and their consequences; the growth of the continents; the uplift and denudation of the land; the work of the atmosphere, ground water, streams, and glaciers; the glaciation of North America; the influence of geographical environment upon plant and animal life and man's response to his physical surroundings.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Students registering in this course are advised to take also the related courses S 8 and S 10, and if possible S 5.

S 2. The Geography and Industry of the United States. Daily except Sat., 8. Geological Lecture Room. Assistant Professor WILLIAMS. Credit, two hours.

The United States as a place in which men live and make a living. The country is divided into economic districts. In each of these districts the most significant industries are discussed and the industrial development is explained in relation to the essential physical features and natural resources.

S 3. The Geography of Europe Daily except Sat., 11. Geological Lecture Room. Assistant Professor WILLIAMS. Credit, two hours.

A regional study of Europe. Special emphasis on the northwestern countries of Europe. Geographic influences in the World War will be considered. Discussion of problems which are facing the countries of Europe in relation to natural resources and other geographical factors will be included.

S 5. Geology. A General Introductory Course. Daily except Sat., 10. Geological Lecture Room. Associate Professor MONNETT. Credit, two hours.

Among the topics discussed are: origin of the earth; geological evolution of continents and ocean basins, the significance, areal distribution, and structural features of the great rock groups, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena; development of the life of the earth.

The lectures will be illustrated with lantern slides, models, maps, and specimens. Students registering for this course are urged to take the laboratory course S 9 and, if possible, course S 10.

S 6. Mineral Resources. Daily except Sat., 12. Credit, two hours. Associate Professor MONNETT.

A general course descriptive of the more important mineral resources of the United States, with briefer reference to commercially important foreign resources. Among the topics discussed are: distribution, uses, manufacture, production by countries, commercial interdependence.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

S 8. Physical Geography, Laboratory Course. T Th, 2-4. Physical Geography Laboratories. Credit, one hour. Dr. CARLSON.

The members of this class will make a systematic study of the physiographic regions of the United States, using contour maps, models, and the experimental laboratory of the department in a laboratory study of the subject. By such study of the topographic, regional, and life relationships (human, animal, and plant) the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish

to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 9. Geology, Laboratory Course. W F, 2-4. General Geology Laboratory. Credit, one hour. Mr. MACCARTHY.

This course is designed to supplement course S 5. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geologic periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 10. Geography and Geology Field Course. This course should be elected by all those registering in Course S 1 or S 5 and is required of all those who desire entrance credit in physical geography. With courses S 1 and S 8 it affords a comprehensive course in physical geography; with courses S 5 and S 9 it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1, 2, 3, 5, 6 are required of all students in the course, and in addition for one hour's credit they must make either 10, or two of 7, 8, and 11.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion, Monday, July 17, at East Ithaca Station, 2.00 p. m. Excursions 1-6, Monday afternoons; 7, 8, 11, all day Saturday; 10 starts on Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be under the general charge of Professor WILLIAMS, with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked, and discussion invited.

OUTLINE OF EXCURSIONS—Course S 10

Monday Afternoons

1. **Eagle Hill.** To become acquainted with the lie of the land about Cornell, to learn the place names of the broader physiographic features, studying en route processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had. July 17.

2. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition, and cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls. July 24.

3. **Shore of Cayuga Lake.** To study shore line phenomena, joint planes, bedding, and stalactite formation. A walk for several miles along the east shore of the Lake. Probably a return by trolley. July 31.

5. **Terminal Moraine. North Spencer.** By train or auto-truck. To study a massive morainic loop, the basin in which the former ice tongue rested, and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell region. August 7.

6. **Six Mile Creek.** To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history. August 14.

All-day Excursions.

7. **Taughannock Gorge and Falls.** By auto-truck. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock, one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 22.

8. **Enfield Gorge and Falls; and Connecticut Hill.** By auto-truck. To study the relations of preglacial and hanging valleys and the postglacial and interglacial gorges, their origin and features. Joint-plane guidance of stream courses. A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell region. In the afternoon, a ride to the top of Connecticut Hill, the highest point in the region. July 29.

Longer Excursions

10. **Niagara Falls and Gorge.** By train and trolley cars, if railroad conditions permit. Overnight at Niagara Falls. August 5. Open to all students in the Summer Session.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory, when the relations of the different places will be explained and illustrated by a large scale relief model of the Niagara region. Students are advised to send to Director U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form; cost 50 cents in coin or money order.

11. **Watkins Glen.** By auto-truck. August 12. Open to all students in the Summer Session.

Watkins Glen is considered one of the most beautiful scenic spots in the country. It has been secured for a State park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake valley in comparison with the conditions at Ithaca as related to the Cayuga valley. Ride across the dissected upland country to the south and west between Ithaca and Watkins.

GERMAN

S 1. First Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Assistant Professor ANDREWS. Credit, four hours. Entrance credit, one unit.

After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German.

S 3. Third Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 190. Professor FAUST. Credit, four hours. Entrance credit, one unit (third unit).

Prerequisite: two years of high school German or its equivalent.

S 4. Rapid Reading. Daily except Sat., 9. G. S. 177. Credit, two hours. Assistant Professor ANDREWS.

German texts of literary value will be read and translated, with casual comment upon their literary significance.

Prerequisite: three years of high school German or the equivalent.

S 5. German Literature since 1880. Daily except Sat., 10. G. S. 190. Credit, two hours. Professor FAUST.

Lectures in German, with collateral reading. Beginnings: the lyric, novel, and drama. Foreign influences. Sturm und Drang. The naturalists. Transition to symbolism. Impressionism. Contemporary expressionism.

German Readings. Interpretative readings from modern German literature will be given on Wednesday evenings at 8 o'clock in G. S. 190 by members of the Department of German.

GOVERNMENT

S 1. American Government. Daily except Sat., 8. G. S. 234. Assistant Professor SABY.

A general survey of the organization, functions, and practical operation of American government and a brief account of the United States as a world power. For teachers of civics and others interested in intelligent citizenship.

S 2. City Government. Daily except Sat., 10. G. S. 234. Assistant Professor SABY.

The organization and activities of city government and politics in the United States, including a study of the commission and city-manager forms of government.

HISTORY

S 1. Greek History. Daily except Sat., 11. G. S. 134. Credit, two hours. Professor OLMSTEAD.

A survey of Greek history with special reference to the needs of teachers; emphasis will be laid on those newer phases of knowledge or of interpretation which are not found in the text books. Lectures, collateral reading, and quizzes.

S 2. Assyrian History. Daily except Sat., 12. G. S. 134. Credit, two hours. Professor OLMSTEAD.

A detailed study of the Assyrian Empire from the sources in translation. Special emphasis will be laid on the international relations, in particular with the Hebrews, on the administration, business, art, and religion, and the light thus thrown on the Biblical writings. Lectures and collateral reading.

S 3. **Modern European History.** Daily except Sat., 10. G. S. 242. Credit, two hours. Professor BECKER.

The history of Europe since 1815.

S 4. **The French Revolution.** Daily except Sat., 11. G. S. 242. Credit, two hours. Professor BECKER.

S 9. **American History.** 1763-1815. Daily except Sat., 9. G. S. 234. Credit, two hours. Professor SIOUSSAT.

The more important aspects of the Revolution; the conditions under the Articles of Confederation; the successful establishment of government under the Constitution; the expansion of the territory of the United States; and the attainment of an independent position in international affairs. Lectures, discussions, and reference readings.

S 10. **American History.** Phases of the Period 1845-1857. Daily except Sat., 11. G. S. 234. Credit, two hours. Professor SIOUSSAT.

This course gives to certain phases of the administrations of Polk, Taylor, Fillmore, and Pierce a more careful study than is possible in a general course, and acquaints the student with the recent literature on this period. The basis of study is the westward expansion of the United States. Some of the topics are: relations with Mexico; expansion on the Pacific Coast; transcontinental transportation; changes in public land policy; the movement for secession in 1849-50; the Kansas question. The work will consist of lectures, readings upon special assignments, and a term paper.

S 17. **Contemporary History** and its teaching in the secondary schools. Daily except Sat., 8. G. S. 264. Credit, two hours. Professor HICKMAN.

This course deals with the history of Europe since the war. The topics studied are the Peace Treaty; the conferences of the premiers; the conferences of the ambassadors; the League of Nations; the Disarmament Conference; England; France; Italy; Germany; Austria; Hungary; Czechoslovakia; Jugoslavia; and Poland. Both in method and in content the course will be useful to teachers in secondary schools, especially such as teach the courses in world history prescribed by the new history syllabus of the University of the State of New York.

LATIN

The courses in Latin offered during the Summer Session are primarily intended for:

1. Teachers of Latin in secondary schools who desire:
 - a. An independent presentation of the history and development of the Latin language;
 - b. A survey of the subjects collateral to the study and teaching of Latin;
 - c. A review of the content of the high-school course;
 - d. A discussion of the methods and of the objectives of the high-school teaching of Latin;
2. Students who have a considerable familiarity with Latin literature and who desire a course not usually given in the undergraduate curriculum;

3. Students who are beginning or are continuing their candidacy for the Master's degree.

S 1. The Technique and the Objectives of Teaching High-School Latin, with especial reference to the American Classical League's Investigation of the Teaching of Latin in the Secondary Schools of the United States. Daily except Sat., 8. G. S. 120. Credit, two hours. Dr. JEFFORDS.

S 2. The Content of the High-School Curriculum. Exercises in prose composition and detailed study of some portions of the works usually read in secondary schools. Daily except Sat., 11. G. S. 120. Credit, two hours. Dr. JEFFORDS.

By taking this course along with supervised supplementary work, students who have not completed the full college entrance requirements may secure credit for one unit in entrance Latin.

S 3. A Survey of the Subjects Collateral to the Study and Teaching of Latin. For graduate students, candidates for the Master's degree, and for teachers of high-school Latin. Daily except Sat., 10. G. S. 128. Credit, two hours. Professor DURHAM.

S 4. Cicero's Orator, and a Study of Latin Prose Rhythm. Primarily for graduate students, candidates for the Master's degree; qualified students not candidates for an advanced degree will also be admitted. Daily except Sat., 9. G. S. 128. Credit two hours. Professor DURHAM.

MATHEMATICS

In addition to the courses noted below, each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses S 1 to S 7 (2) are the equivalent of those having the same numbers in the *Announcement of the College of Arts and Sciences* for 1921-1922.

Courses S 1, S 2, S 3 are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations) and of plane geometry. University credit for S 1, S 2, S 3, S 4, S 6, three hours each.

Students taking S 5, S 7 (1), S 7 (2) are requested to take no other University work during the session without special permission.

University credit for S 5, S 7 (1), S 7 (2), five hours each.

S 1. Solid Geometry. Daily, 11. White 24. Professor SNYDER. (Office hour, 10, White 26). White 9. Mr. LUFKIN. (Office hour, 10, White 8).

S 2. Advanced Algebra. Daily, 9. White 27. Professor SHARPE. (Office hour, 11, White 29). White 1. Assistant Professor GILLESPIE. (Office hour 11, White 3). White 21. Dr. WILLIAMS. (Office hour, 11, White 26.)

S 3. Trigonometry. Daily, 10. White 27. Professor SHARPE. (Office hour, 11, White 29). White 21. Dr. WILLIAMS. (Office hour, 11, White 26).

S 4. Analytic Geometry. Daily, 9. White 10. Assistant Professor CARVER. (Office hour, 11, White 12). White 6. Mr. LUFKIN. (Office hour, 10, White 8).

S 5. Differential Calculus. Daily, 8 and 11. White 6. Assistant Professor HURWITZ. (Office hour, 9, White 8). White 2. Assistant Professor OWENS. (Office hour, 9, White 4). White 28. Dr. REED. (Office hour, 9, White 29). White 10. Mr. MORSE. (Office hour, 9, White 12.)

S 6. Integral Calculus. Daily, 10. White 10. Assistant Professor CARVER. (Office hour, 11, White 12).

S 7 (1). Analytic Geometry and the Calculus. (First term's work). Daily, 8 and 11. Given only if enough students register for the course. Apply to Professor SHARPE, White 29.

S 7 (2). Differential and Integral Calculus. (Second term's work). Daily, 8 and 11. White 5. Assistant Professor CRAIG. (Office hour, 9, White 4).

ADVANCED COURSES

S 62. Projective Geometry. Daily, 9. White 24. Credit, three hours. Professor SNYDER. (Office hour, 10, White 26). The principles underlying projective forms of the first and second degrees will be developed. Although no knowledge of mathematics beyond plane geometry will be presupposed, additional training is highly desirable.

S 42. Analysis. Daily, 10. White 1. Credit, three hours. Assistant Professor GILLESPIE. (Office hour, 11, White 3). A knowledge of the calculus is presupposed. The content of the course will vary from year to year, according to the needs and desires of the students. Correspondence from possible applicants for the course will be welcome. The subjects to be treated will generally be selected from the following list: elementary differential equations, theory of limits and logical foundations of the calculus, theory of point-sets, infinite series, theory of functions of a complex variable.

READING AND RESEARCH COURSES

In addition to the preceding courses, the teachers of mathematics offer the following opportunities to graduate students. Instruction will consist of conferences by appointment, direction of reading, and proposing definite problems for research.

Algebraic Curves and Surfaces. Problems in correspondence and birational transformations. Professor SNYDER.

Applied Mathematics. Problems in Hydrodynamics. Heat, electricity, and elasticity. Professor SHARPE.

Foundations of Geometry and Problems in Synthetic Geometry. Assistant Professors CARVER and OWENS.

Functions of a Real Variable, Point-sets, Calculus of Variations. Assistant Professor GILLESPIE.

Advanced Analysis. Problems in the theory of functions, differential equations, and integral equations. Assistant Professor HURWITZ.

Functions of a Complex Variable. Assistant Professor CRAIG.

MECHANICS OF ENGINEERING

The following courses in Mechanics are open to students from other universities subject to the same requirements for admission as are made for Cornell students.

Classes are held in Lincoln Hall. See bulletin board, north end of Main Hall, at opening of Summer Session. Office, room 35.

S 21. Mechanics. This course is the equivalent of C. E. 221 and consists of S 31, (see below) together with a one-hour course in Work and Energy. Credit, five hours.

The one-hour course consists of two recitations a week and three computing periods during the Summer Session. Hours to be arranged.

S 31. Mechanics. This course is the equivalent of Course 331 of the Sibley School of Mechanical Engineering. Nine recitations and two computing periods a week. Credit, four hours.

Recitations, M T W Th F, 9, and M T Th F, 12. Computing periods to be arranged.

For further information concerning Mechanics of Engineering for the coming Summer Session, write Professor E. W. RETTGER, 321 Mitchell Street, Ithaca, N. Y.

MUSIC

S 10. Harmony. Daily except Sat., 9. Sage Chapel. Credit, two hours. Assistant Professor QUARLES.

A course dealing with the construction and interconnection of triads and chords of the seventh.

S 14. Applied Form and Composition. Daily except Sat., 11. Barnes Hall. Credit, two hours. Mr. KROEGER.

A course in practical composition, including form and design, modulation, harmonization of melodies, and the principles of counterpoint.

S 18. History of Music. Daily except Sat., 10. Barnes Hall. Credit, two hours. Mr. KROEGER.

The historical growth and development of music to the present time.

Chorus. The Department of Music will organize and maintain a choir for the services in Sage Chapel at 11 o'clock each Sunday morning during the Summer Session. The individual tests for this choir will be held in Sage Chapel on Monday, July 10. The rehearsals will be held on Wednesday at 5 and on Sunday at 10. All students having voices and desiring to sing are urged to become members of this choir.

PHILOSOPHY

The courses are intended to be of general rather than of technical interest. Candidates for the degree of Master of Arts who have chosen Philosophy as a major or minor subject will find it advisable to take some of these courses as a basis and preparation for more advanced study. Such students will be given guidance in their special work through individual conferences.

S 1. The Development of Modern Philosophical Thought. Daily except Sat., 8. G. S. 225. Credit, two hours. Professor CREIGHTON.

The main intellectual features of the seventeenth, eighteenth, and nineteenth centuries interpreted in the light of the philosophical ideas of those times and in relation to the theories of the present day.

S 2. Ethical Principles and Their Application. Daily except Sat., 9. G. S. 225. Credit, two hours. Professor CREIGHTON.

A study of ethical principles and of their application to the different fields of individual and social life.

S 3. History and Philosophy of the Fine Arts. Daily except Sat., 10. G. S. 225. Credit, two hours. Professor HAMMOND.

An introduction to the Philosophy of Aesthetics, including an outline of the history of the plastic and graphic arts.

S 4. Greek Civilization. Daily except Sat., 12. G. S. 225. Credit, two hours. Professor HAMMOND.

A history of the chief Greek systems of philosophy and their survival in the Roman Empire and in Christian civilization. Particular attention will be given to the Greek ideals of life as expressed in their literature, art, and political theory and practice.

PHYSICAL EDUCATION

Students desiring to elect courses offered by the Department of Physical Education in the College of Agriculture should correspond with or consult Mr. Laurence S. Hill, Caldwell Hall 282. For descriptions of courses see p. 56.

Swimming and Fencing.

Instruction in swimming and life saving; and in fencing for individual training and for teaching will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: for swimming, \$10; for fencing, \$5, including outfit.

Gymnasium costume and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10-12 a. m., 3-6 p. m. For men, Armory Gymnasium, by appointment. Mr. GELAS.

PHYSICS

Teachers may enter any course that they are prepared to pursue with profit and are entirely at liberty to take portions of courses if such an arrangement is to their advantage.

Those who have not had college physics are advised to take course S 3.

S 3. Introductory Experimental Physics. Credit, six hours. This course is intended to furnish a basis for all following courses as well as to give a fairly complete survey of general physics. Teachers and others familiar with the elements of the subject may find the course useful and instructive.

Lectures and Recitations: The lectures are accompanied by experimental demonstrations. Kimball's *College Physics* will be used for reference. Lectures daily, 8; recitations, daily 9; quiz, M, 10-12. Rockefeller A. Professor GIBBS.

Laboratory: Three two-hour laboratory periods a week. Section A, M, 2-4 and T Th, 10-12; Section B, W F, 10-12 and Th, 2-4. Rockefeller 220. Messrs. FISHER and NORTHROP.

S 4. Heat and Light. Class work. A knowledge of introductory physics such as may be obtained in a first course in college physics will be presupposed. Credit, two hours. Daily except Sat., 12. Rockefeller 105. Assistant Professor KENNARD.

S 7. General Physics. Recitations and problems. Prerequisite Physics 2 or its equivalent and trigonometry. Six recitation periods and one quiz period a week. Credit, three hours. Recitations, daily 12; quiz period, M, 8, or as arranged. Rockefeller 107. Mr. JOLLIFFE.

S 10. Physical Experiments. A general laboratory course of the study of the fundamental physical laws and constants, partly from the qualitative, partly from the quantitative point of view. The work may be varied to suit the interest of the student, since the instruction is in all cases individual. This course presupposes a knowledge of introductory physics but may in some cases be taken at the same time with Physics S 3.

This course is for teachers of elementary physics and for others wishing a greater familiarity with laboratory work. Credit, two hours. T Th, 10-12, and M W F, 2-4.30. Rockefeller 320. Mr. McCORKLE.

S 11. Heat, Light, and Electricity. Recitations. Theory and problems. It is recommended that Physics S 14 be taken simultaneously with Physics S 11. Prerequisites, Physics S 2 and S 7 or their equivalent and the differential and integral calculus. Six recitation periods and one quiz period a week. Credit, three hours. Recitations, daily, 8; quiz period, M, 12, or as arranged. Rockefeller 106. Assistant Professor BIDWELL.

S 14. Physical Measurements. Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurements and observations either as a preparation for graduate study or as an extension of previous work in physics. The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computation, the interpretation of results both analytically and graphically, have special emphasis.

The instruction is individual and the topics covered may be adjusted to meet the needs of the student. Credit, one to four hours. Prerequisites, the equivalent of eight hours of college physics and a knowledge of the elements of calculus. One to four three-hour periods each week. M W F, 9-12 (or 10-1 by special arrangement) and T Th, 2-5. Rockefeller 252. Assistant Professor BIDWELL and Mr. HYATT.

Teachers' Course in Physical Science. Daily except Sat., 10. Rockefeller C. Credit, two hours. Professor HALE. See p 21.

The sequence of courses outlined below is intended to run through three summer sessions. The schedule for the next three summers is:

1922 S22a and S23b, 1923 S22b and S20, 1924 S21 and S23a.

The courses are of the same general character as the corresponding courses given in the fall and spring terms but include somewhat fewer topics. The selection of these topics will be influenced by the interests and needs of the class. Either half of the divided courses, S22 and S23, may be taken without the other.

To profit by these courses a student should have a knowledge of calculus and should have completed courses in general physics covering the principal topics of the subject and of a grade substantially equivalent to that of Physics S 4, and should have had courses in physical measurements substantially equivalent to Physics S 14. If he has not had sufficient laboratory experience he may complete this requirement by taking Physics S 14 simultaneously. A student who contemplates electing any of these courses is advised to correspond with the department about his preparation for the work.

Courses S 20 to S 75 may be taken for credit toward a master's degree in Physics, subject to the requirements of the graduate school. (See Announcement of the Graduate School).

[S 20. **Heat.**] Not given in 1922.

[S 21. **Light.**] Not given in 1922.

S 22a. **Electricity and Magnetism.** Static electric and magnetic fields; direct current phenomena; gaseous, electrolytic, and metallic conduction; chemical and thermal electromotive forces. Credit, two hours. Daily except Sat., 12. Rockefeller C. Assistant Professor COLLINS.

[S 22b. **Electricity and Magnetism.** Electromagnetism, variable current phenomena, electric oscillations.] Not given in 1922.

[S 23a. **Properties of Matter.** Dynamics of particles and rigid bodies, terrestrial and universal gravitation.] Not given in 1922.

S 23b. **Properties of Matter.** Elasticity, surface tension; dynamics of fluids; viscosity. Credit, two hours. Daily except Sat., 8. Rockefeller 105. Assistant Professor KENNARD.

S 25. **Advanced Laboratory Practice.** This course is open to students who have had Physics S 14 (four hours of credit) or its equivalent. It is intended to meet the requirements of the following students: those wishing to take up special topics for detailed study; those taking course S 22a or S 23b and desiring to supplement that work in the laboratory; those who wish to develop their laboratory technique in preparation for research. Credit varies with the amount of work done. The laboratory will be open daily except Sat., 9-12. Rockefeller 301. Assistant Professor COLLINS.

S 49. **Modern Developments in Physics.** A discussion of certain topics selected after conference with the members of the class including especially those that are not usually included in general texts. Whenever feasible, experimental demonstrations will be given. Three hours a week as arranged. Credit, one hour. Rockefeller C. Professor GIBBS and Assistant Professor KENNARD.

S 75. **Special Topics for Investigation.** Students who are prepared to profit by the use of the library and laboratory facilities of the department in the study of some special topic or in investigation will be given an opportunity to do so. This work may be taken in connection with or independently of any of the above courses and will be under the direction of one or more members of the staff, with whom frequent conferences should be arranged. Credit varies with the nature and amount of work done.

For further information regarding opportunities for research and investigation during the Summer see the Announcement of the Graduate School.

PSYCHOLOGY

S 1. **Psychology.** Lectures: M T W Th, 9. Professor TITCHENER. Recitations, F, 9, Assistant Professor DALLENBACH, Assistant Professor HOISINGTON, and Dr. BISHOP. G. S. Room C. Credit, two hours.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with the brief discussion of the nature of a scientific psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagina-

tion, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall.

Textbook: Titchener, *Textbook of Psychology*.

S 2. Attention. Daily except Sat., 10. G. S. Room C. Credit, two hours. Assistant Professor DALLENBACH.

In this course the applications of Attention to advertising, to conjuring and sleight of hand, to hypnosis, to testimony, to efficiency, and to learning will receive special emphasis. The application will, however, be made only after the student has been grounded in the elementary facts and laws of Attention. The development, the conditions, the kinds, and the levels of Attention will first be considered; then the experimental investigations will be reviewed; and thereafter the practical considerations will be taken up.

Demonstrations and class-experiments will be used frequently for illustration. No textbook will be prescribed, but the lectures will be supplemented by assigned readings in standard works.

S 3. Memory and Learning. Daily except Sat., 8. G. S. Room C. Credit, two hours. Assistant Professor HOISINGTON.

The chief topics to be treated in this course are: the general nature of memory; the curve of learning; the conditions of impression, association, recall, and recognition; the correlation between different memories and between memory and other mental functions; teaching and the presentation of material; recitation and examination; "cramming" and efficient study; unusual memories and their conditions; the formation and the breaking of habits; mnemonic schemes and the "training" of memory.

Demonstrations and class-experiments will be made throughout the course. Readings will be assigned in standard texts and monographs to be found in the library.

S 4. Qualitative Laboratory. M W F, 2.00-4.30. Psychological Laboratory, Morrill Hall. Credit, two hours. Assistant Professor HOISINGTON and Dr. BISHOP.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's *Experimental Psychology*, vol. i, Qualitative Student's Manual.

S 5. Quantitative Laboratory. Three afternoons (to be arranged), 2.00-4.30. Psychological Laboratory, Morrill Hall. Credit, two hours. Assistant Professor DALLENBACH.

This course aims to furnish such training in the psychophysical methods and in the handling of instruments of precision as will be adequate preparation for

research problems. The student will make experimental determinations of the stimulus limens, will attempt verifications of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. The textbook is Titchener's *Experimental Psychology*, vol. ii, Quantitative Student's Manual.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in course S 6.

S 6. Experimental Problems. Hours and credit to be arranged. Psychological Laboratory, Morrill Hall. Assistant Professor DALLENBACH, Assistant Professor HOISINGTON, and Dr. BISHOP.

Courses S 1, S 4, and S 5, or their equivalents, are prerequisites for this course. The work will consist of the original study of certain experimental problems, and will involve both observation and manipulation of instruments. Completed investigations may be published in *The American Journal of Psychology*.

S 7. Problems and Persons in Systematic Psychology: Advanced Course. Daily except Sat., 11. G. S. Room C. Professor TITCHENER.

This course presupposes S 1 and S 4 or their equivalents. Certain of the major problems and personalities in systematic psychology will be discussed in some detail, with numerous references for collateral reading. A knowledge of French and German is necessary.

PUBLIC SPEAKING—ORAL ENGLISH

In the courses described below individual instruction will be given by appointment without additional charge. All work will be planned to meet the special needs of high-school teachers.

S 1. Public Speaking. Daily except Sat., 11. G. S. 21. Credit, two hours. Dr. CAPLAN.

A practical training for speaking in public. Constant emphasis and drill on methods of preparation and standards of delivery. High-school teachers will find the methods applicable to their work in public speaking and in oral English. Original speeches, prepared and extemporaneous selections. Regular students passing this course are admitted to second term of Public Speaking 1.

S 1b. Argument and Debate. Daily except Sat., 9. G. S. 21. Credit, two hours. Dr. CAPLAN.

Training in analysis and in brief-drawing, with a study of the principles of conviction, persuasion, and rhetorical presentation. Emphasis on the adaptation of argumentative material to audiences. Practice in speaking and debating, with drill in delivery. This course presupposes Public Speaking 1 a or S 1, and will be considered equivalent to the second term of Public Speaking 1.

S 3. Course for High-School Teachers. Daily except Sat., 8. G. S. 21. Credit, two hours. Mr. UTTERBACK.

Methods of teaching, planning of high school courses, speech-making, oral English, debate, constant practice in speaking and drill in methods of preparation. Students taking course S 3 are advised to elect other courses in the department, and in such cases the work will be adjusted to the needs of the individual. Registered auditors may attend on Tuesday and Thursday.

S 5. The Production of School Plays. Daily except Sat., 9. G. S. 26. Credit, two hours. Consent of instructor necessary for admission. Professor DRUMMOND and Mr. HUDSON.

To give teachers sufficient knowledge of play-production to meet the growing demand in the schools for dramatics that have an educational value. Theory of stage direction, choice of plays, elements of training, staging of plays, and other practical phases of production. One act plays rehearsed. A wide selection of practical helps will be available. Auditors may register for Tuesday and Thursday only. Students in course S 5 should also take S 10 or S 8.

S 8. Voice Training. Daily except Sat., 10. G. S. 21. Credit, one hour. Assistant Professor MUCHMORE.

Exercises for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speaker's sore-throat; training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized. If needed, special exercises will be prescribed. This course is fundamental for teachers of Speech Training.

S 8a. Advanced Voice Training and Speech Correction. Prerequisite, S 8, or its approved equivalent, and the consent of instructor. M W F, hour to be arranged. G. S. 26. Credit, one hour. Assistant Professor MUCHMORE.

Readings in the science underlying voice-training and speech-correction, and discussions of theories and methods. For those having sufficient background to do somewhat independent work. Students may be required to take S 8.

S 10. Oral Reading. Daily except Sat., 12. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

Primarily to help teachers of literature and oral English, but open to all students. The first part of the course will be devoted to the elements of reading: attention, individualization, and sequence of ideas; the second part to the oral interpretation of literature, with special emphasis on the spirit rather than the form. Each member of the class will have private appointments, and will prepare individually at least one extended selection. Regular students who pass this course are admitted to the second term of Oral Reading, course 10.

S 14. Public Speaking. Credit, two hours. Daily except Sat., 12. G.S. 26. Mr. UTTERBACK.

Training of correct and effective speech; with particular attention to tone and distinctness of utterance. Brief speeches before the class.

Open only to students in Physical Education. See p. 61.

S 33. Pageantry. Credit, one hour. Daily, 2.30. G. S. Room B. Mr. HUDSON and Professor DRUMMOND.

The history of pageantry; its educational and community value; the relation of history, poetry, song, folk lore, and drama to pageantry; the technique of writing, directing, and producing pageants; grouping and pageant acting; costuming. The class will plan original scenes and episodes.

S 20. Seminary. For graduates. Hours to be arranged. Consult Professor DRUMMOND.

For the study of special subjects in the rhetoric, psychology, literature, and history of public address. (See Announcement of the Graduate School.)

Round Table Discussions. Last three weeks of the Session, at hour to be arranged. No credit. G. S. 21. Open only to students regularly registered in courses in the Department.

Discussion of teachers' problems in oral English, public speaking, debate, speech defects, dramatics, methods, and texts. Regular programs will be announced.

ROMANCE LANGUAGES

FRENCH

S 1. Elementary Course. Daily except Sat., 8 and 12. G. S. 290. Credit, four hours. Mr. BRIQUET.

Entrance credit, one unit.

The object of this course is twofold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity of studying the methods of presentation of these subjects to beginners.

S 2. Intermediate Course. Daily except Sat., 8 and 12. G. S. 283. Credit, four hours. Dr. HOFFHERR.

Entrance credit, one unit. Prerequisite, course S 1 or its equivalent.

S 3. Advanced Course. Daily except Sat., 8 and 12. G. S. 227. Credit, four hours. Mr. CURY.

Entrance credit, one unit. Prerequisite, course S 2 or its equivalent.

S 4. Advanced Translation. Daily except Sat., 9. G. S. 290. Credit, two hours. Prerequisite, course S 3 or its equivalent. Dr. HOFFHERR.

S 5. Elementary Composition and Conversation. Daily except Sat., 11. G. S. 290. Credit, two hours. Prerequisite, course S 3 or its equivalent. Assistant Professor PUMPELLY.

S 14. Advanced Composition and Conversation. Daily except Sat., 10. G. S. 283. Credit, two hours. Professor GUERLAC.

Rapid translation from standard English texts into French; frequent theme-writing; short talks by the student on history and literature; conversation exclusively in French.

[S 17. Contemporary French Drama. Daily except Sat., 11. Credit, two hours.

Lectures in French on French dramatic literature from 1850 to 1920, with outside reading, reports, and talks by the students.] Not given in 1922.

[S 19. Oral Composition. Daily except Sat., 9. G. S. 221. Credit, two hours.

A study of oral composition from the point of view of the teacher of French. Some attention will be paid to the use of phonetics and phonetic transcription in the teaching of oral composition. The course will be conducted partly in French.] Not given in 1922.

S 21. Contemporary French Novel. Daily except Sat., 8. G. S. 221. Credit, two hours. Professor MASON.

Lectures and discussions of special topics in contemporary literature, with extensive outside reading and reports.

S 23. Introduction to French Philology. Daily except Sat., 9. G. S. 221. Credit, two hours. Assistant Professor PUMPELLY. Special emphasis will be put upon the importance of a knowledge of philology for teachers.

S 26. Racine. Daily except Sat., 11. G. S. 227. Credit, two hours. Mr. BRIQUET.

Lectures in French on the life and works of Racine and 'explications de textes.'

S 30. The Teaching of French. Daily except Sat., 10. G. S. 290. Credit, two hours. Professor MASON.

A detailed discussion of the more modern methods of teaching French. Lectures, assigned reading, and observation.

S 35. France of To-day. Daily except Sat., 12, G. S. 264. Credit, two hours. Professor GUERLAC.

Lectures in French on France as a country, as a nation, and as a state, with emphasis on the constitutions, the customs, the social, political, and intellectual life of the present day.

Outside reading, reports, and talks in class by the students.

French Readings. A series of readings in French will be given by those in charge of Les Maisons Françaises daily except Saturday at 2.15 p. m. in the Drawing Room of Sill Cottage.

French Lectures. A series of lectures in French dealing with French national life will be given by the members of the instructing staff in French on Wednesday evenings at 8 o'clock in Goldwin Smith Hall, Room 290.

Les Maisons Françaises. The Sill Cottage and the Craig Cottage, both situated on the Campus and convenient to Sage College, have been reserved for students of French. Each house will be in charge of a French lady and there will be abundant opportunity for conversation in French. Reservations should be made before June 1. There will be also at Sage College special tables where only French will be spoken.

SPANISH

S 1. Elementary Course. Daily except Sat., 8 and 12. G. S. 277. Credit, four hours. Mr. HALL.

Entrance credit, one unit.

S 2. Intermediate Course. Daily except Sat., 8 and 12. G. S. 281. Credit, four hours. Mr. CROWELL.

Entrance credit, one unit.

S 3. Advanced Course. Daily except Sat., 8 and 12. G. S. 124. Credit, four hours. Mr. RIVERA.

Entrance credit, one unit.

S 5. Elementary Composition and Conversation. Daily except Sat., 11. G. S. 281. Credit, two hours. Mr. CROWELL.

S 7. Advanced Composition and Conversation. Daily except Sat., 11. G. S. 277. Credit, two hours. Mr. RIVERA.

Special attention will be given to free composition and correspondence. The course is conducted in Spanish.

S 16. The Novel of the Golden Age. Daily except Sat., 8. G. S. 128. Credit, two hours. Professor KENISTON.

Lectures, outside reading, reports, and discussions.

S 19. Nineteenth Century Drama. Daily except Sat., 9. G. S. 281. Credit, two hours. Professor KENISTON.

Lectures, translation, and discussion of representative plays.

S 30. The Teaching of Spanish. Daily except Sat., 10. G. S. 281. Credit, two hours. Mr. HALL.

A course for the discussion of materials and methods in the presentation of Spanish in the secondary schools. Special attention will be given to phonetics, class-room methods, the choice and use of texts, and auxiliary materials.

Spanish Lectures and Readings. A series of lectures and readings in Spanish by members of the instructing staff will be given during the session.

La Casa Española. The Risley Cottage will be reserved for students of Spanish and will be in charge of a Spanish Directress. There will also be in Prudence Risley Hall a special table at which only Spanish is spoken. Students desiring rooms in the Spanish House should make reservations before June 1.

SHOP WORK

S 10. Machine Work. Instruction in the operation of various standard machine tools; use of measuring and hand tools; fitting and assembly. Daily, 8-11 or 9-12. Daily except Sat., 2-5. Professor WELLS.

M. E. 300. Foundry. Moulding, core making, mixing, melting, and pouring of metals; use of molding machines for quantity production. Daily, 8-11 or 9-12. Daily except Saturday, 2-5. Mr. PATTERSON.

The course will be given only if a sufficient number enroll to justify the operation of the shop.

STRUCTURAL ENGINEERING

The following courses are the same as those given in the School of Civil Engineering during the college year. For further information about the content of any course or about the assigned hours communicate with Professor E. N. BURROWS.

C. E. 270. Structural Design and Bridge Stresses. Credit, four hours. Prerequisite, Mechanics 20. One-fourth of the course includes structural detail, i.e., the design of a wooden roof truss and of other timber joints. The remainder of the course includes dead load, live load, wind load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and road roller loads. This course is equivalent to first term C. E. 270. Lectures, recitations, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 29. Assistant Professor BURROWS.

C. E. 271. Structural Design. Credit, three hours. Prerequisite, Mechanics 20 and first term 271. This is an elementary course in Steel Design. Lectures, computations, and drawing. Complete design, detail drawing, bill of material, and estimate of weight of a steel roof truss, a thorough and deck plate girder bridge. This course is the same as second term C. E. 271. At hours to be assigned. Lincoln Hall 14. Assistant Professor BURROWS.

C. E. 274. Bridge Design. Elective. Seniors and graduates. Credit, three hours. Prerequisite, course 271. Computations and drawing for the complete

design of a riveted railroad bridge of six or seven panels, the stresses for which were computed in connection with the previous study of bridge stresses. The computations to determine the sections of all members and of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in the form of systematically arranged reports. The drawing consists of general detail plans showing the location of all rivets as well as the composition and relation of all members and connections. The final reports are to give a full list of shapes and plates, and a classified analysis of weight for the span. Textbook: Merriman and Jacoby's *Roofs and Bridges*, Part III. Computation and drawing. Assistant Professor BURROWS.

C. E. 280. **Concrete Construction.** Credit, three hours. Prerequisite, courses 20 and 21. Concrete materials, properties of plain concrete, its making and deposition. Elementary theory of reinforced concrete as applied to columns, rectangular beams and slabs, T-beams, and beams reinforced for compression. Direct stress combined with flexure. Laboratory work includes the making and testing of columns, beams, and bond specimens. Recitations, laboratory, and computing periods. Assistant Professor URQUHART.

C. E. 282. **Concrete Design.** Elective. Seniors and graduates. Credit, three hours. Prerequisite, course 280. This course may be substituted for Engineering Design, course 91. Applications of the theory of reinforced concrete to the design of various types of retaining walls. Selective problems in the design of reinforced concrete structures such as buildings, sewers, etc. Reports and drawings. Assistant Professor URQUHART.

C. E. 283. **Reinforced Concrete Arch.** Seniors and graduates. Elective. Credit, three hours. This course may be substituted for Engineering Design, course 91. Prerequisite, courses 20 and 21, and the first part of course 271. The design of an arch of reinforced concrete including its abutments and centering. The general form and proportions are determined by two preliminary investigations. The final investigations of the arch ring are made in accordance with the elastic theory, the live loading for maximum unit-stresses in the arch ring, as well as the direction and magnitude of abutment thrusts, being determined by means of influence lines. The design is supplemented by several illustrated lectures on the different types of concrete arch bridges of recent construction, their principal details, methods of erection, and influence on design. Textbook: Hool's *Reinforced Concrete Construction*, Vol. III. Lectures, computation, and drawing. Assistant Professor URQUHART.

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STATE COLLEGE OF AGRICULTURE

OFFICERS

Livingston Farrand, A.B., A.M., M.D., LL.D., President of the University.
Albert Russell Mann, B.S.A., A.M., Dean of the College of Agriculture, Director of the Experiment Station, and Director of Extension.

George Alan Works, Ph.B., M.S.A., Professor of Rural Education, in charge of the Summer School.

Robert Pelton Sibley, A.B., M.A., L.H.D., Professor and Secretary.

STAFF OF INSTRUCTION

Arthur Augustus Allen, A.B., A.M., Ph.D., Assistant Professor of Ornithology.
Elsa Guerdrum Allen, A.B., Assistant in Ornithology.

Charles Beaman, Teacher, Brockport State Normal School.

Frederick Gardner Behrends, B.S., Assistant Professor of Rural Engineering.

Cora E. Binzel, Acting Professor of Rural Education.

Orville Gilbert Brim, B. Ped., M.A., Ph.D., Professor of Rural Education.

Frances Artie Brookins, Associate Director of Costume Shop, Home Economics.

Harry Oliver Buckman, M.S.A., Ph.D., Professor of Soil Technology.

Julian E. Butterworth, A.B., Ph.D., Professor of Rural Education.

Thomas Nixon Carver, Ph. D., Professor of Economics, Harvard University.

Peter Walter Claassen, A. B., A. M., Ph. D., Assistant Professor of Biology.

George Harris Collingwood, B.S., A.M., Assistant Professor of Forestry.

Anna Botsford Comstock, B.S., Emeritus Professor of Nature Study.

Lewis Josephus Cross, B.A., Ph.D., Professor of Chemistry in its Relations to Agriculture.

Irene Dahlberg, Assistant in Home Economics.

Alexander M. Drummond, A.B., A.M., Professor of Public Speaking.

Marjorie Dunn, Special Teacher of Physical Training, Public Schools, Albany, N.Y.

Theodore Hildreth Eaton, A.B., A.M., Ph.D., Professor of Rural Education.

Paul W. Eckley, B. A., Assistant, Department of Hygiene and Preventive Medicine, and Freshman Coach.

Maude Lee Etheredge, M. D., Assistant Medical Adviser for Women.

Lois Farmer, Instructor in Home Economics.

Emery N. Ferriss, Ph.B., Ph.D., Assistant Professor of Rural Education.

Edgar Stevenson Furniss, Ph.D., Assistant Professor of Political Economy, Yale University.

A. Leah Gause, Assistant in Nature Study.

Helen Goodspeed, B.S., Formerly State Supervisor of Home Economics in Wisconsin.

Adrian G. Gould, Ph.B., M.D., Instructor in Hygiene and Assistant Medical Adviser.

Adele Lewis Grant, B.S., M.A., Assistant in Botany.

Jeanne M. Gray, B.A., Formerly State Supervisor of Physical Education in Pennsylvania.

Ruth Hatteroth, Teacher.

Elsa R. Heilich, Director of Physical Education for Girls, Central Commercial and Manual Training High School, Newark, N.J.

Ethel Hinckley Hausman, B.S., Assistant in Rural Education.

Gustave Frederick Heuser, B.S., M.S. in Agr., Ph.D., Assistant Professor of Poultry Husbandry.

Laurence S. Hill, B.S., Director of Physical Education, Public Schools, Albany, N. Y.

Asher Hobson, M.A., Associate Professor of Economic Agriculture, Columbia University.

Hoyt Hopewell Hudson, M.A., Instructor in Public Speaking.

Paul Krimmel, G.G., Supervisor of Physical Education, Public Schools, Syracuse, N. Y.

Paul J. Kruse, A.B., Ph.D., Professor of Rural Education.

Eva May Luse, B.A., M.A., Head of Department of Teaching, Iowa State Teachers' College.

William Foster Lusk, B.Ph., M.S.A., Professor of Agriculture, Agricultural College, Mississippi.

Carolyn Brundage McIlroy, Director of Costume Shop.

Arthur C. Maroney, Supervisor of Physical Education, Public Schools, Englewood, N. J.

M. S. Markle, Ph.D., Professor of Botany, Earlham College.

L. H. MacDaniels, A.B., Ph.D., Assistant Professor of Pomology.

Lua Alice Minns, B.S., M.S. in Agr., Instructor in Floriculture.

Helen Monsch, B.S., M.A., Assistant Professor of Home Economics.

W. C. Muensch, A.B., A.M., Ph.D., Instructor in Botany.

Miles D. Pirnie, Assistant in Ornithology.

Harold A. Pratt, B.S., M.A., Instructor in Floriculture.

Juan Estevan Reyna, E.E., Assistant Professor of Rural Engineering.

Frank Elmore Rice, A.B., Ph.D., Assistant Professor of Chemistry in its Relations to Agriculture.

Harold Ellis Ross, M.S.A., Professor of Dairy Industry.

Ezra Dwight Sanderson, B.S., Ph.D., Professor of Rural Social Organization.

Henry William Schneck, B.S., M.S.A., Assistant Professor of Vegetable Gardening.

Dean F. Smiley, A.B., M.D., Assistant Professor of Hygiene and Medical Adviser.

Franklin Orrin Smith, Ph. D., Professor of Education, University of Montana.

Rolland Maclaren Stewart, A.B., Ph.D., Professor of Rural Education.

William Alonzo Stocking, M.S.A., Professor of Dairy Industry.

William Emil Utterback, A.B., Instructor in Public Speaking, Dartmouth College.

F. B. Wann, A.B., Ph.D., Instructor in Botany.

George Frederick Warren, Ph.D., Professor of Farm Management.

Karl McKay Wiegand, B.S., Ph.D., Professor of Botany.

Cass Ward Whitney, B.S., Instructor in Rural Organization.

Wilford Murry Wilson, M.D., Professor of Meteorology.

George Alan Works, Ph.B., M.S.A., Professor of Rural Education.

Albert Benedict Wolfe, A.B., A.M., Ph.D., Professor of Economics and Sociology, University of Texas.

Isadore Yavitz, A.B., Assistant Director of Physical Education, Boys' High School, Albany, N. Y.

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides courses of instruction under the rules and regulations that follow:

1. **Admission.** The Summer School in the College of Agriculture is designed to meet the needs of persons engaged in educational work, such as teachers, supervisors, superintendents, extension workers, and others concerned with activities of an educational nature.

Persons enrolling for courses in Physical Education should make certain by correspondence or conference that they have sufficient academic preparation so that they will be eligible for a recommendation to certification upon the completion of their study.

2. **Tuition and Fees.** Tuition in any of the courses following is free to admitted students who are residents of New York State and who have been so for at least one year. Others will pay a tuition fee of \$40, whether one subject or more is taken. For the time and place of payment see page 9.

In some of the courses a fee to cover the cost of materials used will be charged. An incidental fee of five dollars is charged all students in Physical Education.

Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

3. For special announcement regarding Physical Education see page 56.

4. **Academic Credit for Work.** A student who has previously satisfied the entrance requirements of the College may obtain credit for work in a Summer School up to a limit of eight hours. Residence credit will be given if six hours are passed, but not more than a total of two terms of residence may be obtained by attendance at Summer Schools.

The demand for some courses is not great enough to justify offering them each year. For this reason certain departments of the College offer instruction only in alternate years. For the requirements for the degree B. S. (eight terms, 120 hours, etc.) see the Announcement of the College of Agriculture.

Summer Term. Advanced and research courses are offered in many departments of the College in a twelve weeks term beginning in the latter part of June. See separate announcement.

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

S 2. **Farm Management.** Credit, three hours. Lectures, daily except Sat., 9. Two laboratory periods a week. Farm Management 102. Students must report to the department, before the course begins, for assignment to laboratory sections. Professor WARREN and Mr.——.

This course is designed for persons who have had considerable farm experience. It should be preceded by economics and as many as possible of the courses dealing with the production of crops and animals. ■ ■ ■

Lectures, recitations, and laboratory practice. Farming as a business; types of farming; balance of business; rates of production; farm layout; building arrangement; labor management; machinery; marketing; ways of beginning a farm; forms of tenure and leases; choosing and buying a farm; use of capital and credit;

planning, organization, and management of specific farms. Out-of-town trips necessitate leaving on noon trains and returning on evening trains. Some expense for auto hire. Laboratory fee, \$2.

S 10. Marketing. Credit, two hours. Lectures, daily except Sat., 8. Farm Management 102. Professor HOBSON.

A study of the present organization, functions, and operations of the market structure, with particular reference to agriculture. Laboratory fee, \$1.

S 30. Agricultural Economics. Credit, two hours. Prerequisite, Economics 51 or equivalent. Lectures, daily except Sat., 11. Farm Management 102. Professor CARVER.

A study of the relation of rural economy to nation building, following as far as possible the problem method, beginning with the problem, How many people can the United States feed from its own soil under varying systems of production and standards of consumption? Why do people emigrate, concentrate in dense populations, or spread out in sparse populations? What effect on life and on agriculture does the outdoor work of farm life produce? What are the effects on the art of food production of different land policies and systems of land tenure, systems of tenancy, large and small holdings, colonization, etc.? The economic and social results of different systems of agricultural labor; of different systems of distributing farm products; of different systems of farm finance; rural credit, etc.

S 40. Public Problems of Agriculture. Credit, two hours. Lectures, daily except Sat., 12. Roberts. Professors CARVER, WARREN, HOBSON, and others.

A series of lectures intended to give a brief survey of some of the outstanding economic, social, and educational problems of agriculture. Among the speakers will be agricultural leaders of national prominence.

AGRONOMY

S 1. Principles of Soil Management. Credit, three hours. Prerequisite, Chemistry 101 and Geology 1 or their equivalents. Lectures and recitations, daily except Sat., 9. Caldwell Hall 31. Laboratory practice, T Th, 2-4.30. Caldwell 31. The course will not be given unless six or more register. Professor BUCKMAN.

A comprehensive course dealing with the origin, composition, and properties of soils, with particular reference to their management in crop production. The laboratory work consists of practice designed to demonstrate fundamental physical and chemical relations. Laboratory fee, \$2.

BACTERIOLOGY

S 1. Bacteriology. Credit, two hours. Lectures, T Th 9. Dairy Building 222. Laboratory, M W F, 2-5. Dairy Building 122. Professors STOCKING and Ross.

A general course in bacteriology covering the general characteristics of bacteria, methods of study, and their relation to the sanitary and economic phases of agriculture. This course is given by the Department of Dairy Industry and is especially designed for teachers of agriculture, botany, and biology. Laboratory fee, \$3.

BIOLOGY

S 1. General Biology. Credit, three hours. Lectures and recitations, daily except Sat., 11. Roberts Hall 392. Laboratory and field work, M W F, 2-4.30; other sections by special appointment. Roberts Hall 302. Assistant Professor CLAASSEN and Mr.——

This is a course designed to acquaint the general student and the prospective teacher with the main ideas of biology through selected practical studies of the phenomena on which biological principles are based. Lectures, laboratory work, and field trips will deal with such topics as: Interdependence of organisms as illustrated by insects and flowers, insects and galls, etc.; the simpler organisms, such as amoeba, paramoecium, flagellates, and other protozoans; and algae, fungi, bacteria, and slime molds among plants. The study of these simpler organisms will be followed by studies of such plant types as liverworts, mosses, and ferns, and such animal types as hydra, earthworm, and frog.

Prospective teachers will be given an opportunity to acquaint themselves with methods of collecting and preparing material for class use. If there is a sufficient demand, a one-hour conference each week will be arranged for students in the course who are interested in the discussion of special problems in the teaching of biology.

Students completing this course will be given credit for the first term work in Biology 1 of the regular academic year. Laboratory fee, \$2.50.

BOTANY

The courses in botany are planned to meet the needs of high-school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and class-room work will be supplemented by lantern slides, charts, microscopic, museum, and herbarium material. It is likely that some round table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The richness of the fungous and the algal floras, as well as the great number of mosses, liverworts, ferns, and flowering plants, render field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified; marshes, fields, woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken and three longer all-day trips. The all-day trips will occur on Saturdays and will entail an extra expense of \$1 to \$2 for each. Women will find the bloomer or knickerbocker costume desirable for field work.

In addition to the laboratory fee in each course a deposit of \$2 will be required from each student to whom a vasculum or other special apparatus is assigned.

S 1. Elementary Botany. Credit, three hours. Lectures, M W, 8. Laboratory, M W, 9-1, F, 8-1, with additional reading or field work. Botanical Laboratory, Stone Hall. Dr. WANN.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Attention will also be given to special morphology of the higher plants. Field work will replace laboratory hours to a limited extent and some all-day trips will be required.

A general course planned as an introduction to the study of botany and as a preparation for advanced courses. It is intended also to cover certain phases of college entrance requirements and of general secondary school botany. This course is conducted mainly in the laboratory. Field trips will replace laboratory hours to a limited extent only. Laboratory fee, \$3.50.

S 4. Identification, Classification, and Ecology of the Higher Plants. Credit, two hours. Prerequisite, some training in structural botany, either previously or in connection with this course. Lectures, Th, 8. Laboratory or field, T, 8-1, Th, 9-1. Botanical Laboratory, Stone Hall. Professor WIEGAND and Dr. MUENSCHER.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological association and modification of the various species and varieties will be noted. The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.

If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, \$2.50.

S 5. Trees and Shrubs. Credit, one hour. Prerequisite, some training in structural botany, either previously or in conjunction with this course. Lectures, Th, 2. Laboratory or field work, T Th, 3-5. Stone Hall. Dr. MUENSCHER.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in course S 4. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral and foliar characters, their structure, methods of growth, habits, and distribution. Much of the work will be in the field, supplemented by laboratory practice, lectures, and demonstrations. Some all-day trips are required. Laboratory fee, \$1.50

CHEMISTRY

S 805. Agricultural Chemistry. General Course. Credit, two hours. Prerequisite, introductory chemistry. Lectures, daily except Sat., 9. Caldwell Hall 100. Professor CROSS.

The relation of chemistry to agriculture, and an introduction to the study of the composition and chemical properties of plants, fertilizers, feedstuffs, insecticides, and fungicides.

S 806. Agricultural Chemistry, Introductory Laboratory Course. Credit, two hours. Prerequisite, qualitative and quantitative analysis. M T W Th, 2-5. Other sections by special arrangement. Caldwell Hall 250. Assistant Professor RICE.

Chemical tests and the simpler analyses of plant materials, feedstuffs, soils, fertilizers, insecticides, and fungicides, with the end in view of giving the student a clear knowledge of their chemical composition and behavior. Recitations held during laboratory periods.

S 650. Chemistry of Foods and Food Products. Credit, two hours. Prerequisite, introductory chemistry; should be preceded also by a course in organic chemistry. Lectures, daily except Sat., 11. Caldwell Hall 100. Professor CROSS.

The chemical composition, chemical properties, and methods of manufacture of the principal foods and food products. Methods for the determination of the normal constituents of foods. Special attention given to the chemistry of milk and milk products, cereal products, sugars, fruits, and fruit products.

S 820. Chemistry of Foods, Elementary Laboratory Course. Credit, two hours. Prerequisite, introductory chemistry; should be preceded also by a course in organic chemistry. M T W Th, 2-5. Other sections by special arrangement. Caldwell Hall 250. Assistant Professor RICE.

The chemistry of proteins, fats, carbohydrates, potable water, baking powders, jellies, syrups, butter, oleomargarine, olive oil, salad oils, cheese, milk, food preservatives, artificial coloring, flavoring extracts, habit-forming agents, tooth powders, and so forth. Recitations held during laboratory periods.

S 825. Chemistry of Foods and Food Products. Laboratory Course. Credit, two hours. Prerequisite, qualitative and quantitative analysis and organic chemistry. M T W Th, 2-5. Caldwell Hall 250. Assistant Professor RICE.

Designed as a beginning laboratory course for students expecting to take further work in the chemistry of foods. The conventional "complete" analysis of carbohydrate foods is made. Examination and analysis of proteins, fats, carbohydrates, soaps, baking powders, jellies, syrups, butter, oleomargarine, olive oil, salad oils, cheese, milk, artificial coloring, flavoring extracts, and so forth.

S 860. Special Topics and Research. Students desiring special advanced work in soils, fertilizers, insecticides, fungicides, foods, dairy products, feeding stuffs, condimental stock feeds, etc., or those taking research should register for this course. One to three hours may be taken. Consult Professor CROSS or Assistant Professor RICE not later than registration day.

ECONOMICS

S 2. Labor Problems. Daily except Sat., 8. G. S. 242. Assistant Professor FURNISS.

A study of the conditions of labor as affected by the industrial development of modern society. Especial attention is given to the aims and tactics of organized labor; the types and programs of the labor unions; the legal status of the union program; and the effect of the labor movement on social welfare.

S 3. Industrial History. Daily except Sat., 9. G. S. 242. Assistant Professor FURNISS.

A survey of the evolution of industry from the Industrial Revolution to the present day; the development of modern forms of organization and the effect of industrial changes on the welfare of society.

ENTOMOLOGY

S 4. Elementary Morphology of Insects. Credit, three hours. Laboratory open daily except Sat., 8-5; Sat., 8-1. Twenty-one hours of laboratory work a week required. Roberts Hall 391. ———.

An introductory laboratory course required of all students who plan to do advanced work in entomology. Laboratory fee, \$2.

S 5. Elementary Systematic Entomology. Credit, two hours. Fifteen hours of laboratory work a week required. Must be preceded or accompanied by course S 4. Laboratory open daily except Sat., 8-5. Sat., 8-1. Roberts Hall 391. ———.

Practice in the identification of insects and in the method of phylogenetic study as illustrated by their wing venation. With course 4, required of all students who plan to do advanced work in entomology. Laboratory fee, \$3.

FLORICULTURE

S 1. Garden Flowers. Credit, one hour. Lectures, M W F, 8. Laboratory, F, 2-4.30. Greenhouses. Miss MINNS.

This is designed as an elementary course to be of value in home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this work, and to cover methods of propagation and culture.

S 2. Indoor Flower Growing. Credit, one hour. Lectures, T Th, 11. Laboratory, T, 2-5. Greenhouses. Mr. PRATT.

The propagation and culture of plants suitable for winter gardens in school rooms, including a study of containers, soils, fertilizers, insecticides, are the basis of this course. The selection of varieties of bulbs and their methods of culture indoors are considered, as are also the method of propagation and general care of species of plants suited for indoor culture.

FORESTRY

S 1. The Tree and The Forest. Credit, one hour. T Th, 10. Field work, M, 2-4.30. Forestry Building 122. Assistant Professor COLLINGWOOD.

This course lays emphasis on simple means of identification of the principal forest trees of this region. It includes a study of the characteristics of forest trees and forest types: the life history of the forest and other facts fundamental to the right use of forests. Some attention will be given to the identification and the commercial uses of a few of the principal kinds of wood.

Field work supplements the work in the lecture room.

S 2. Forests and Forestry. Credit, two hours. Lectures, M T W F, 8. Field work, Th, 2-4.30. Forestry Building 122. Assistant Professor COLLINGWOOD.

This course will carry forward the foundation work of Forestry S 1. It presupposes a working knowledge of the native trees. The two courses, while independent, are supplementary of each other. Forestry S 1 is not prerequisite.

Topics to be considered: the nature and scope of forestry; methods employed in the perpetuation of forests; the economic importance of forests to the nation, including influence on stream flow and the relation of the forest to recreation with special application to New York State; brief description of the forest regions of the United States; present status of Federal, State, and private forestry.

As far as is possible, the lectures are followed by opportunities to make practical observations in the field.

HOME ECONOMICS

The courses in Home Economics are planned to meet the needs of teachers in rural schools and colleges and extension workers. For entrance requirements see p. 46. The courses in methods of teaching are given in the Department of Rural Education and descriptions of these courses will be found under that heading.

S 3a. Introductory Course in Foods, Part I. Credit, five hours. Lectures, daily except Sat., 8. Home Economics Building 245. Practice, daily except Sat., 9-1. Home Economics Building 200.

This course parallels the regular course in foods and will be accepted as equivalent to the first term's work in Foods 3. Laboratory fee, \$15.

S 3b. Introductory Course in Foods, Part II. Credit, four hours. Prerequisite S 3a. Lectures, daily except Sat., 9. Home Economics Building 245. Practice, daily except Sat., 10-1. Home Economics Building 205. Assistant Professor ———.

This course parallels the regular course in foods and will be accepted as equivalent to the second term's work in Foods 3. Laboratory fee, \$15.

Courses for establishing a fundamental knowledge of foods. The lectures will include a discussion of the composition and characteristics of foodstuffs; sources and methods of manufacture of foods; principles of selection and methods of preparation of foods; preservation of foods; conservation of foods; comparative nutritive and economic values of various foods. Laboratory practice will be given in applying scientific principles to food-preparation.

S 4. Dietetics. Credit, three hours. Lectures and recitations, daily except Sat., 9. Home Economics Building 100. Laboratory practice, T Th, 2-5.30. Home Economics Building 200. Written reviews for those wishing credit in the course, Sat., 9. Assistant Professor MONSCH and ———.

This course will include a discussion of the fundamental principles of nutrition as they apply to the human being; the practical means of applying scientific principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. The laboratory work will consist of exercises in estimating the comparative cost and nutritive value of various foods; in planning and judging various types of dietaries, in preparing typical meals. Open only to students who have had course S 3 or its equivalent. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$7.50.

S 31. Nutrition of School Children. Credit, two hours. Prerequisite S 4 or its equivalent. Lectures and recitations, M W, 11. Home Economics Building

100. Laboratory practice, M W F, 2-5. Home Economics Building 205. Open only to students expecting to teach. Assistant Professor MONSCH.

The nutrition of the school child and ways of improving it will be considered. Laboratory work will be conducted among groups of children of school age.

S 50. Lunch Room Management. Credit, four to seven hours. Only graduates of courses in Home Economics or persons having successful practice in the management of food service for large numbers and practical knowledge of food-preparation will be admitted to this course. Before registering, candidates must give satisfactory evidence of their ability. Daily from 7 a. m. to 7.30 p. m. with intervals of rest. Home Economics Cafeteria. Miss FARMER and Miss DAHLBERG.

An intensive course for training managers of school lunch rooms, cafeterias, or similar institutions. The course will include lectures, demonstrations, and laboratory practice in management and organization, systems of accounting, purchasing, marketing, and storage, quality judging of raw and cooked products, planning, preparing, and serving food in large quantity. The cafeteria conducted by the School of Home Economics will be used as a laboratory. Laboratory fee, \$15.

S 60. Clothing and Textiles, Introductory Course. Credit, three hours. Practice, daily except Sat., 8-10.30. Home Economics Building 300. Lectures, M W F, 12. Home Economics Building 300. Number of students limited to fourteen.

This course includes hand and machine sewing, the use of commercial patterns, drafting and designing of patterns, household mending, and simple embroidery. A cooking apron, a combination suit, a lingerie blouse, and a petticoat are made. The work consists of demonstrations, discussions, and practice. Students provide all materials, subject to the approval of the instructor. Estimated expense, \$10 to \$12. Laboratory fee, \$3.

S 70a. Constructive Costume Design. Credit, two hours. Prerequisite S 60 or its equivalent and elementary design. Practice, daily except Sat., 2-5. Home Economics Building 300.

This course includes a study of the fundamental principles of design as expressed in modern costume. Students develop these principles by means of paper, materials, and blackboard sketching. Designing is done with flat patterns and through draping. Open only to students expecting to teach. Estimated expense, \$8.

S 75. Commercial Clothing Instruction. Credit, two to four hours. Prerequisite or parallel S 70a. Open only to students preparing to teach. Prerequisites, courses S 60, S 61a, or the equivalent. Laboratory practice by arrangement. Home Economics Costume Shop, Home Economics Building. Mrs. McILROY and Miss BROOKINS.

This course considers problems of dressmaking and shop management. The students work under instructors experienced in commercial practice. Dressmaking problems in construction, fitting, finishing, designing, and in meeting customers are considered. The shop is equipped as a typical shop with a number of paid workers; hence it furnishes an opportunity to work out problems in shop organization and management.

S 80. Elementary Millinery. Credit, two hours. Prerequisite S 60 or its equivalent. Practice, daily except Sat., 10.30-1. Home Economics Building 305.

This course considers the methods and manipulation in the construction of hat frames out of wire, buckram, willow, and crinoline; the use and renovation of old materials; the preparation of trimmings; the study of color, shape, and trimmings as to suitability, becomingness, and income; comparison with commercially-made hats. Students provide all materials for hats; estimated cost, \$6 to \$10. Laboratory fee, to cover cost of laboratory materials, \$3.

S 90. **Textiles.** Credit, two hours. Practice, daily, 8-10.30. Home Economics Building 400.

This course includes the intensive study of fabrics with a view to their appropriateness in clothing. A study is made of the history of the processes of manufacture of fabrics. Analysis of weave, microscopic identification, chemical and physical testing of fabrics; simple dyeing. Estimated cost from \$3 to \$5. Laboratory fee, to cover cost of laboratory materials, \$3.

S 120. **Household Management.** Credit, two hours. Lectures, daily except Sat., 8. Home Economics Building 100.

S 160. **Extension in Home Economics.** Credit, three hours. Prerequisite, graduation from accredited courses in Home Economics or the equivalent. Lectures, daily except Sat., 10. Home Economics Building 265. Practice, T Th, 2-5. A third laboratory period to be arranged for. Home Economics Building 265.

This course will include a study of the plans for extension work in New York State and in other typical states; legislation, both State and Federal, promoting extension work; programs for developing county extension work; state and other agencies already at work and the possibilities of co-operating with them. Problems in the formation of councils, working committees, project groups, office organization, and management; ways of securing funds; publicity. The course will also give the extension worker practice in organizing home economics projects for individuals or for groups. Special attention will be paid to projects for nutrition classes and to school lunches. Suitable subject-matter for club programs. Recent subject-matter on nutrition and clothing will be reviewed. Opportunity will be given for work and observation in the field. Laboratory fee, \$5.

METEOROLOGY

S 1. **Meteorology and Climatology.** Credit, two hours. Lectures and discussions, daily except Sat., 10. Roberts Hall 292. Professor WILSON.

This course is adapted to the needs of teachers and students of subjects in which weather and climate are important factors, particularly teachers of physical geography and general agriculture. It is designed to acquaint the student with the laws governing the primary and secondary circulation of the atmosphere and with the development, progression, and conditions that attend cyclones, tornadoes, and other atmospheric phenomena.

Attention is given to the principles and practice of weather forecasting from weather maps and from local observations.

S 2. **Meteorology and Climatology, Laboratory Course.** Credit, one hour. T or Th, 2-5, or other period to be arranged. Must be accompanied by Course S 1. Dairy Building 341. Professor WILSON.

The work consists in the study of the principal weather and climatic elements with the aid of maps, charts, and instruments. The various meteorological instruments will be studied, as well as the methods of taking and recording the observations.

NATURE STUDY

S 1. General Nature Study. Credit, two hours. Lectures, M W F, 10. Forestry 16. Field and laboratory observations, T Th, 10-12, or 2-4. Forestry 16. Professor COMSTOCK, Mrs. HAUSMAN, Miss GAUSE, Mr. BEAMAN.

The object of this course is to train teachers in making personal observations along several lines of nature study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature study in the grades.

S 3. Nature Literature. Credit, two hours. Lectures, M W F, 11. Laboratory period to be arranged, Forestry 16. Professor COMSTOCK.

Only those who have had course S 1 or its equivalent are eligible. This course includes discussions of nature study reference books, nature story writers, and nature essayists and poets.

S 4. Friends and Enemies of the Garden. Credit, two hours. Lectures, T Th, 8. Laboratory and field work, M W F, 9-11. Forestry 16. Dr. DETWEILER. Place to be announced.

This course is designed especially as an aid to teachers of gardening. It deals with common garden insects and their natural foes. The laboratory periods are devoted to a personal study of the life-histories of insects. The methods employed may be used in nature-study lessons supplementary to school gardening.

For announcement of courses in the teaching of elementary science in secondary schools see under Rural Education, p 68.

ORNITHOLOGY

S 1. Ornithology. Credit, three hours. Lectures, M W F, 11. McGraw 5. Laboratory, M W, 2-5, or T Th, 2-5. Field work, M W, or T Th, 5.30-8 a. m. Assistant Professor ALLEN, Mrs. ALLEN, and Mr. PIRNIE.

This course gives an introduction to the study of birds and familiarity with the local species. The lectures cover such subjects as classification, migration, coloration, song, nest-building, eggs, care of young, methods of attracting birds, and economic importance. The laboratory work with bird skins gives an intimate knowledge of the birds of Eastern North America and familiarity with the use of a manual. The aim of the field work is the identification of birds by their songs, as well as by their plumage and habits. Each student should be provided with Chapman's *Handbook of Birds of Eastern North America* and with field or opera glasses. Laboratory fee, \$2.

The inconvenience of the early morning trips and the desire, expressed by students, to be with persons of kindred interests, has given rise to the request for a dormitory where the women studying ornithology can live together during

the summer. Accordingly, if a sufficient number apply to Professor ALLEN before June first, an attractive dormitory will be reserved where meals can be secured at convenient hours.

S 2. Applied Ornithology. Credit, two hours. Lectures, T Th, 11. McGraw 5. Laboratory and field work, T Th, 2-5. Open only to those who are taking the elementary course or who have had its equivalent. Assistant Professor ALLEN.

This course is intended to meet the needs of teachers or students who plan further study of ornithology. The lectures cover the field open to prospective ornithologists, methods of teaching, preparation of specimens and lantern slides, bird photography, wild life conservation, and game farming. The laboratory and field work will give practical exercises. Laboratory fee, \$2.

PHYSICAL EDUCATION

Object. Legislation requiring that physical training shall be taught in public schools has created a demand for teachers and supervisors of this subject. There is also need for teachers who can supervise health education, for playground supervisors, and for coaches and athletic directors. In order to assist persons who desire to prepare for work of this kind, the New York State College of Agriculture has designed a schedule of carefully graded courses requiring four and five summer schools for completion. This arrangement of work enables students, teachers, and supervisors to enter upon a complete and systematic study of physical education until the four and five summer school certificate has been earned. It also enables them to engage in teaching during the year and thus acquire necessary experience.

Tuition. See page 46. Admission to classes is restricted to duly registered students. All students registered for physical education are required to pay an incidental fee of \$5.

Advanced Standing. Students desiring advanced standing in physical education will be required to send a certified copy of the courses in which they wish to receive credit, with a statement of the amount and character of work accomplished, to Laurence S. Hill, in care of the College of Agriculture, Ithaca, N. Y., at least one week before the session opens, or to pass an examination in those subjects in which they wish to receive credit. Examinations for this purpose will be conducted in Roberts Hall, July 7, at 9 o'clock.

Certificates. At the end of each summer session a certificate of attendance is issued to all students completing satisfactory work. See page 11. Students desiring to receive the four summer school certificate in physical education will be required to complete the work as outlined for the four summer schools or their equivalent. Students desiring to receive the five summer school certificate in physical education will be required to complete the work outlined for the five summer schools, or their equivalent. No certificate will be awarded to any student who has not attended at least two full sessions. No student will be admitted to the courses without approval of his program. Students doing satisfactory work will be recommended to the State Department of Education for temporary certificates. Upon the completion of the four or five years of work, they will be recommended for a permanent certificate in such states as grant certificates. The New York State Department of Education recognizes the four summers' course as equivalent to a two years' normal training course.

PHYSICAL EDUCATION TIME SCHEDULE

First Year

8.00- 9.00	S 40	General Course for Rural Teachers
8.00- 9.30	S 1	(Sec. 1) Anatomy and Histology
9.30-11.00	S 1	(Sec. 2) Anatomy and Histology
11.15-11.45		{ Gymnas tics 1B, M.W.F.
		{ Gymnastics 1C, T.Th.S.
11.50-12.20	S 2	{ Apparatus, M.W.F.
		{ Tactics, T.Th.S.
		{ Rhythmic Steps, M.W.F.
12.15- 1.00		{ Wands, T.Th.S.
2.30- 3.30	S 4	Schoolyard Athletics, M.W.F.
	S 3	First Aid, T. Th.
3.30- 4.00		Folk and Athletic Dancing
4.15- 5.15	S 8	Track Athletics

Second Year

8.00- 9.00	S 11	Hygiene
9.15- 9.45		{ Dumb-bells, M. W. F.
		{ Indian Clubs, T.Th.S.
9.50-10.20	S 12	{ Tactics, M.W.F.
		{ Singing Games and Story Plays, T.Th.S.
10.25-10.55		{ Gymnastics III, M.W.F.
		{ Apparatus, T.Th.S.
11.00-12.00	S 13	Physiology
12.00-1.00	S 14	Public Speaking
3.30- 4.00		Aesthetic Dancing
4.15- 5.15	S 5	Basket Ball

Third Year

8.00- 9.00	RE S2	Psychology
9.00-10.00	S 21	Physical Diagnosis
10.00-11.00		
11.15-11.45		{ Indian Clubs, M.W.F.
		{ Gymnastics IV, T.Th.S.
11.50-12.20	S 22	{ Wands, M.W.F.
		{ Tactics, T.Th.S.
12.25- 1.00		{ Apparatus, M.W.F.
		{ Dumb-bells, T.Th.S.
2.30- 3.30	S 24	Kinesiology
	S 7	Baseball; S 10 Football,—Men.
3.30- 5.30	S 7	Baseball; S 9 Hockey and Tennis, Women
4.00- 4.30		Aesthetic Dancing

SUMMER SESSION

Fourth Year

8.00- 9.00	S 29	Special Methods of Teaching
9.00-10.00	"	Demonstration School
10.00-11.00	RE S4	Principles of Teaching
11.15-11.45		{ Tactics, M.W.F.
		{ Wands, T.Th.S.
11.50-12.20	S 32	{ Apparatus, M.W.F.
		{ Folk Dancing, T.Th.S.
12.25- 1.00		{ Folk Dancing, M.W.F.
		{ Apparatus, T.Th.S.
2.30-3.30	S 31	History and Principles, M.W.F.
4.30- 5.00		Aesthetic Dancing

Fifth Year

8.00- 9.00	S 41	Scouting, M.W.
9.15- 9.45		{ English Country Dancing, M.W.F.
		{ American Country Dancing, T. Th.S.
9.50-11.00	S 42	{ Interpretative Dancing (Women) M.W.F.
		{ Boxing and Wrestling (Men), M.W.F.
9.50-11.00		{ Fencing, T.Th.S.
11.00-12.00	RO S16	Place of Play in the Community, T.Th.S.
	S 43	Prescription and Correction, M.W.F.
12.00- 1.00	S 44	Organization and Administration, T.Th.S.
2.30- 3.30	S 33	Pageantry
3.30- 4.30	S 6	Games. Scouting Field Trip, Th.
		Swimming—by Appointment

Admission. See page 46.

Playground Teachers and Directors:—

For those desiring to equip themselves as playground teachers and directors the following courses are essential:

- Physical Education S 11. Hygiene.
- Physical Education S 4. School Yard Athletics.
- Rural Education S 2. Educational Psychology.
- Physical Education S 21. Physical Diagnosis.
- Physical Education S 33. Pageantry.
- Physical Education S 8. Track and Field Athletics.
- Physical Education S 35. Swimming.
- Physical Education S 3. First Aid.
- Physical Education S 26. Special Methods.

Activities: Games of low and high organization; apparatus; rhythmic steps; folk dancing; English and American country dancing; special features, organized games, and general practice.

Athletic Coaches:—

For those desiring to equip themselves as athletic coaches, the following courses are essential:

- Physical Education S 3. First Aid.
- Physical Education S 29. Special Methods.
- Physical Education S 44. Prescription and Correction.
- Physical Education S 2. First Year Practice.
- Physical Education S 22. Third Year Practice.
- Physical Education S 4. School Yard Athletics.
- Physical Education S 6. Games.
- Physical Education S 7. Baseball.
- Physical Education S 8. Track and Field Athletics.
- Physical Education S 9. Hockey and Tennis.
- Physical Education S 10. Football.
- Physical Education S 41. Scouting.

Class-room teachers who wish to become acquainted with playground activities and their direction and supervision, should confer with Mr. Hill regarding the proper courses to meet their special problems.

Costumes. Women *must* provide themselves with all-white middy blouses (no colored collars), black or dark blue bloomers, black *cotton* stockings, black ties, and white tennis shoes.

Men *must* provide themselves with quarter-sleeve tennis or gymnasium shirts, long Y.M.C.A. trousers (blue with white stripe), and white tennis shoes.

Residential halls, rooms, board. See page 11. It is suggested that women students in Physical Education apply for rooms in Sage College, in which one of the gymnasiums is located. Rooms are reserved in the order of application.

FIRST YEAR

S 1. Histology and Anatomy. Credit, two hours. Lectures and laboratory, two sections, daily, 8-9.30 and 9.30-11. Stimson Hall. Mr. ECKLEY and Dr. GOULD.

In this course the various tissues and organs of the human body will be studied briefly in their minute structure in the laboratory. This work will be supplemented by lectures illustrated with charts and lantern slides. Demonstration of specially prepared microscopic sections including a brief consideration of embryology will be included.

Anatomy in its gross aspect will be presented through the medium of charts, models, diagrams, lantern slides, museum preparations, and living models, the chief purpose being to familiarize the student with the anatomy of the body as it presents itself to the teacher of physical training.

S 2. First Year Practice. Credit, two hours. Daily except Sat. p. m., 11-1; 3.30-4. Old Armory.

This course includes elementary practice in calisthenics, tactics, Swedish gymnastics, rhythmic steps, wands, apparatus, folk and athletic dancing, games of low organization, and stunts.

S 3. First Aid. Credit, one hour. T Th, 2.30. Gymnasium Lecture Hall. Dr. SMILEY.

The principles and methods of first aid will be fully discussed and demonstrated, stress being placed upon the actual practice by the student of the various procedures under the direct supervision of the instructor. The course will completely cover the requirements of the Red Cross First Aid Certificate.

S 4. School Yard Athletics. Credit, one hour. M W F, 2.30. Gymnasium and Athletic Field. Mr. MARONEY.

(a) Games and Stunts.

(b) Group Athletics.

In this course the general idea of group athletics, the badge test organizations, and athletic meets, with special reference to rural districts, will be taken up and practical demonstrations given.

(c) Conduct of playgrounds; construction of equipment; games:

This course deals with play programs; how to organize a playground staff; how to plan and construct a playground; its equipment; the field house and the details concerned in playground management; administration of municipal recreation; legislation; budget-making; the relation of recreation executives to the community and its various activities.

SECOND YEAR

S 11. Hygiene. Credit, two hours. Daily, 8. Stimson Hall. Dr. SMILEY.

This course consists of lectures, chart exhibits, and frequent quizzes. The general laws of health will be discussed, including the essentials of personal hygiene, sex hygiene, school hygiene, and public health. The recognized division of educational hygiene will be considered, with special emphasis upon the scope and methods of school medical inspection, school nursing, control of communicable diseases in the schools, operation of school clinics, organization of health clubs, location and treatment of children mentally or physically exceptional or defective, the approach to nutritional problems of school children; and the development of a system of records in the administration of the foregoing phases of health activity.

Special attention will be given to the consideration of rural health problems as they present themselves to a community health leader or organizer. The

health problems peculiar to the teachers of physical education will receive, throughout the course, particular attention. Textbook required of all students, Rodger Lee, *Health and Disease*.

S 12 Second Year Practice. Credit, two hours. Daily except Sat. p. m., 9-11; 3.30-4. Old Armory.

Second year or intermediate practice includes tactics, Indian clubs, dumb-bells, gymnastics, apparatus, singing games and story plays, aesthetic dancing.

S 13. Physiology. Credit, one hour. Daily, 11. Stimson Hall. Mr. ECKLEY. Textbook, *Essentials of Physiology*, Bainbridge and Menzies.

This course consists of lectures, demonstrations, chart exhibits, and quizzes; the essentials of physiology, peculiar to the teacher of physical education; particular attention to the physiology of exercise and fatigue.

S 14. Public Speaking. Credit, two hours. Daily except Sat., 12. G.S. 26. Mr. UTTERBACK.

Training in correct and effective speech; with particular attention to tone and distinctness of utterance. Brief speeches before the class.

THIRD YEAR

S 2. Rural Education. Psychology. Daily except Sat., 8. See page 65.

S 21. Physical Diagnosis. Credit, one hour. Daily, 9. Stimson Hall. Dr. SMILEY.

This course is designed to familiarize the students with the general methods of physical examination and the modern diagnostic procedures available. The normal will first be demonstrated and then the various departures from the normal will be indicated and discussed. The diagnosis of the diseases and physical defects of school children will be discovered from the practical aspect and with the aim of giving the students a working knowledge of the conditions they will actually face in daily routine as school nurses or as teachers of physical training.

S 22. Third Year Practice. Credit, two hours. Daily except Sat. p. m., 11-1; 4-4.30. Old Armory.

This course includes advanced work in gymnastics, tactics, apparatus, Indian clubs, wands, dumb-bells, aesthetic and athletic dancing.

S 24. Kinesiology. Credit, one hour. Daily except Sat., 2.30. Stimson Hall. Dr. GOULD.

This course deals with the principles and mechanisms of bodily movements. The mechanism of representative types of exercise is studied for the purpose of determining, as far as possible, their intermediate and permanent effects upon health.

FOURTH YEAR

S 26. Method and Practice of Teaching Physical Education. Credit, two hours. Daily, 8. Demonstrations, daily except Sat., 9. Gymnasium. Mr. HILL.

This course will include the theory of teaching gymnastics and calisthenics, simple gymnastic positions and movements, miscellaneous exercises, gymnasium tactics, and apparatus work; the pedagogical principles involved in calisthenics or

drills, the physiological principles, general order of exercise in a drill, factors which should guide in the selection of exercises; how to write a drill and how to plan gymnastic lessons for use in the elementary schools; the principles of posture.

The methods of teaching physical training, observation, and criticism, and the actual presentation of assigned work will be included in this course. Work adapted to rural schools will receive special emphasis. Practice under schoolroom conditions with children of various grades will be offered.

S 4. Rural Education. Principles of Teaching. Daily except Sat., 10. See page 65.

S 32. Fourth Year Practice. Credit, two hours. Daily except Sat. p. m., 11-1; 4.30-5.

Work in tactics, apparatus, folk dancing, wands, aesthetic dancing. This course is for advanced students.

The courses as outlined under First, Second, Third, and Fourth years are required of candidates for the certificate.

S 31. History and Principles of Physical Education. Credit, one hour. M W F, 2.30. Miss GRAY.

The object of this course is to give the students a connected outline of the rise and development of physical education from the time of the Greeks and Romans through to the present day; to impress the importance of national health by thorough knowledge of the causes of success and failure of ancient peoples; and to emphasize the present-day attempt to make bodily activity a recognized factor in moral and mental as well as in physical development.

FIFTH YEAR

S 41. Scouting. Credit, one hour. M W, 8, and Thursday afternoon field trip. Miss HATTEROTH.

Camp-fire Girls, Boy Scouts and Girl Scouts require trained leaders. This course is designed to be a training course for such work. The work of Camp-fire Girls will this year be emphasized, but opportunity will be given to become acquainted with the work of the other organizations.

S 42. Fifth Year Practice. Credit, two hours. Daily except Sat., 9-11.

This course includes special dancing, including English and American country dancing, interpretative dancing for women, boxing and wrestling for men, and fencing. Swimming should be taken as a part of this course, by appointment.

Rural Organization. S 16. The Place of Play in the Community. See p. 70.

S 43. Prescription and Correction. Credit, one hour. M W F, 12. Gymnasium Lecture Room. Miss ———.

This course includes the diagnosis, selection, and arrangement of exercises commensurate with a patient's age, strength, general constitution, and mode of living; the application of gymnastics to the ordinary physical handicaps of the bodily structure commonly found in the schools, such as round shoulders, flat chests, drooping heads, protruding hips, curvatures, etc. The principles and application of massage in connection with the object of treatment; physiological effects and general rules of massage.

S 44. Organization and Administration. Credit, one hour. T Th S, 12. Gymnasium Lecture Room. Mr. HILL.

This course will deal with problems in organization, administration, and supervision of physical education in schools and colleges. Discussion of problems in city, state, and national physical education legislation will be taken up.

S 33. Pageantry. Credit, one hour. Daily, 2.30. Goldwin Smith Room B. Mr. HUDSON and Professor DRUMMOND.

The history of pageantry; its educational and community value; the relation of history, poetry, song, folk lore, and drama to pageantry; the technique of writing, directing, and producing pageants; grouping and pageant acting; costuming. Emphasis on the production of small festivals, play pageants, and school celebrations for various occasions. The class will plan original scenes and episodes.

COURSES IN ATHLETICS

It is not possible for students to complete the following athletic courses in any one summer. Students are asked to choose wisely and extend the work of the afternoon program over four or more years.

S 6. Games. Credit, one hour. M T W Th, 3.30. Girls' Athletic Field and Gymnasium. Mr. MARONEY.

This course includes games of high organization such as volley ball, captain ball, indoor baseball, soccer, etc.

S 7. Baseball. Credit, one hour. Daily first two weeks, 3.30-5.30 (men). Athletic Field. Mr. ECKLEY. 4.30 (women). Girls' Athletic Field. Mr. MARONEY.

Theory and practice during the first two weeks; discussion and explanation of rules, principles of coaching, fundamental elements of fielding, batting, sliding, base running, and inside baseball.

S 8. Track and Field Athletics. Credit, one hour. Lectures and practice, daily except Sat., 4.15. Schoellkopf Field. Miss GRAY, Mr. O'CONNELL, and Mr. KRIMMEL.

The work consists of the theory and practice of the various track and field events for men and women, such as hurdling, standing and running broad jump, standing and running high jump, racing start, short and long distance running, shot put, baseball throw, and basketball throw. The duties of officials are thoroughly explained, studied, and practised; meets are organized and conducted.

S 9. Hockey and Tennis. Credit, one hour. Alternating days, 4.45. Girls' Athletic Field. Miss ———.

Full instruction is given in field hockey, a popular athletic game which affords exhilaration as well as plenty of vigorous exercise. A definite explanation and a thorough study of each rule is made, the advantages and disadvantages of certain plays are fully discussed and demonstrated, and actual participation in competitive games is experienced. In tennis the various strokes, methods of serving and receiving are taught, as well as the advantages of matches and tournaments.

Special classes will be formed at 9 and at 4.30 for those wishing tennis only, provided a sufficient number register.

S 10. Football. Credit, one hour. Daily except Sat., last four weeks, 3.30-5.30. Gymnasium and Schoellkopf Field. Mr. ECKLEY.

Football, theory and practice. Discussion of rules, principles of teaching the fundamentals, offensive and defensive tactics, different systems of coaching.

S 40. General Course in Calisthenics and Recreation for the Class-room Teacher. Credit, one hour. Daily except Sat., 8. Gymnasium.

Drill in giving response and rhythmic commands, securing responses, graded marching tactics, free gymnastics, mimetic exercises, rhythmical steps, and supervised recreational activities. The various divisions of the State Syllabus of Physical Training will be considered.

ELECTIVES

S 35. Swimming. Daily, except Sat. Hour to be arranged. Mr. O'CONNELL. Instruction in swimming, life saving, and resuscitation. The various swimming strokes will be demonstrated and taught. The course is open to a limited number. Special fee, \$10.

Equitation. Daily. Hours to be arranged. Major CHRISTIAN, First Sergeant JENSEN, Sergeants ANDERSON and MCFARLAND, and Private CAHILL of the Field Artillery Detachment, Cornell University. Special fee, \$5.

Courses in equitation are open only to students regularly enrolled in Physical Education.

S 36. Elementary Class (Men). Practical equitation and horsemanship; nomenclature; care of horses and of equipment; management of the stable; the seat; the aids; work on the track; posting; cross-country riding.

S 37. Riding Class (Women.) A course more elementary than S 36, yet covering much the same ground. Selected mounts.

S 38. Advanced Class. For men who have had experience in riding. The seat; the rein; leg aids; exercises on long lines with and without stirrups; exercises on the circle; posting; the walk, trot, and gallop; jumping; cross-country riding; the care, conditioning, and training of horses.

A fee of \$1 will be charged for grooming each rider's horse.

POMOLOGY

S 1. Elementary Pomology. Credit, three hours. Not open to regular students in Agriculture. Lectures, daily except Sat., 10. Laboratory, F, 2-4.30 and S, 8-10.30. Roberts 202. Assistant Professor MACDANIELS.

A study of general practices in pomology, including the propagation and care of orchard trees and small fruits, with emphasis on the underlying principles of plants and plant growth, harvesting, storing, and marketing. Laboratories require practical work in budding, grafting, pruning, planting; study of varied growth habits and bud formation. Laboratory fee, \$3.50.

POULTRY HUSBANDRY

S 1. Principles and Practice of Poultry Management. Credit, five hours. Lectures, daily, 8. Poultry Building 325. Laboratory, T Th F, 2-4.30, Poultry Building 300. Assistant Professor HEUSER.

Designed primarily for teachers in agricultural high schools and other secondary agricultural schools. The course consists of thirty-six lectures and preliminary examinations, and eighteen laboratory practice periods; and includes

a general discussion and practical application of the principles of incubation; brooding; rearing; feeding; illumination; breeding for constitutional vigor and egg production; sanitation and disease; marketing; housing; and general poultry farm management.

Feeding, incubating, brooding, and marketing practice each day by appointment. Morning, 7.30-8.15; noon, 12.45-1.30; evening, 4.30-5.00. Poultry Auxiliary Buildings. Practice in feeding for egg production and for fattening includes the preparation for market, record keeping, and general care and management of fowls. Practice in incubating includes operation of incubators, disinfection, record keeping, and general management of the hatch. Brooding practice includes feeding, brooding, caring for young chicks, keeping of temperature, food, and growth records. Marketing practice includes cleaning, testing, grading, packing, and shipping eggs, and preparing poultry for market. Laboratory fee, \$5.

RURAL EDUCATION

The Department will issue a special announcement describing courses in trade and in industrial education.

S 2. **Educational Psychology.** Credit, two hours. Section I, daily except Sat., 8. Caldwell Hall 100. For students in Physical Education. Section II, daily except Sat., 11. Caldwell Hall 143. Section III, daily except Sat., 10. Caldwell Hall 143. Professors LUSE, SMITH, and —.

The original nature of man; reflexes, instincts, and capacities; laws of learning and of habit-formation; acquisition of motor control; memorizing; efficiency and improvement; transfer of training; individual differences; mental measurement.

S 4. **Principles of Teaching.** Credit, two hours, Section I, daily except Sat., 11. Caldwell Hall 282. Section II, for students in Physical Education only, daily except Sat., 10. Caldwell Hall 100. Professors STEWART and SMITH.

A consideration of the problems of teaching: how to motivate study, cultivate interest, organize teaching materials, plan classwork, select and solve problems, construct and present questions, drill, measure the results of teaching; etc., to make clear the principles which are fundamental to efficient instruction.

S 6. **Agriculture in the High School.** Credit, two or three hours. Daily except Sat., 9. Caldwell Hall 143. Laboratory, T Th, 2-4.30. Caldwell Hall 282. Professor STEWART.

The problems that the teachers of agriculture will meet in secondary schools: the vocational point of view, the construction of yearly teaching plans, the home project, the organization of the materials of instruction in the agriculture subjects, forms of teaching applicable to situations, equipment and supplies, community activities.

S 7. **Home Economics in the High School.** Credit, three hours. Lectures and discussions, daily, 8-10. Conference hours, M W, 11. Home Economics 265. Acting Professor BINZEL and Miss GOODSPEED.

This course includes lectures, discussions, observation of teaching, and teaching. Problems treated: organization and administration of homemaking departments; plant and equipment; textbooks; references; illustrative material; critical study of and preparation of courses of study; home project; school lunch; budgets;

records; relation of the home economics department to the school and the community; review and direct application of educational theories to presentation of subject matter.

S 10. Educational Measurement. Credit, two hours. Section I, daily except Sat., 9. Caldwell Hall 282. For teachers, principals, and superintendents.

The need, the means, and the general method of measurement in education; typical tests and scales from the point of view of their use by the teacher, supervisor, and administrator; relation of achievement tests and mentality tests; elementary statistical terms and methods; teachers' marks.

Section II, M W F, 2-3.30, Caldwell Hall 282. For directors and supervisors of industrial and continuation schools. Professor KRUSE.

A consideration of the need and methods of measurement in education as related to the work of the industrial and continuation classes and schools. School achievement tests, mentality tests, aptitude tests, and trade tests; teachers' marks; nature of mentality; distribution of individuals in a single trait and in a combination of traits.

S 14. Teacher-Training Institutions for Teachers of Agricultural Vocations. Credit, two hours. Lectures, daily, 8. Caldwell Hall 282. Professor LUSK.

A course based upon a study of the work of teachers of agricultural vocations in secondary schools. In the light of such study will be discussed: the demands upon the teacher in terms of capacities and abilities; current and ideal standards of qualification in teachers; the aims, admission requirements, course-content, methods, and administrative organization of institutions for the training of teachers of agricultural vocations.

S 15. Problems of Training Teachers of Home Economics. Credit, two hours. Daily except Sat., 2. Home Economics 265. Acting Professor BINZEL.

This course is designed to meet the needs of those who are engaged in teacher-training or who wish to prepare for such work. The problems studied include the organization and administration of teacher-training departments; curriculum of teacher-training institutions; organization and development of courses; relation to secondary schools.

S 17. The Rural and Village Principalship. Credit, two hours. Daily except Sat., 8. Caldwell Hall 143. Assistant Professor FERRISS.

A course designed primarily for principals of high schools having also the elementary grades and for those preparing for such positions. It deals with such practical problems as the preliminary organization of the work of the school; the keeping and use of school records; the testing, grading, and promotion of pupils; school government and problems of discipline; direction and control of pupil's activities; pupil guidance and the supervision of pupil's study; aims and methods of supervision; teachers' meetings; measurement of teachers' efficiency; the problem of school exercises; the principal and the community.

S 18. Principles of Rural School Administration. Credit, two hours. Daily except Sat., 9. Stone Hall 192. Professor BUTTERWORTH.

The purpose of this course is to develop the principles that govern the organization and administration of education in a state, particularly with reference to the rural situation. The chief problems to be considered are: functions of local, State, and intermediate units of school control; an evaluation of different types of local and intermediate units—county, township, district, community;

forms of organization for the most effective performance in each unit; Federal leadership; functions of laymen and professional officers; sources of school funds; methods of distributing them; state regulation of school finances; budget making. An application of the principles developed will be made to several fundamental problems.

S 19. Administrative Problems of District and County Superintendents. Credit, two hours. Daily except Sat., 3. Stone Hall 192. Professor BUTTERWORTH.

This course will consider some of the chief problems of the superintendent as the responsible rural school leader: (1) ideals of such leadership and methods of securing community co-operation in making leadership effective; (2) an evaluation of the legal responsibility and authority of the superintendent; (3) the school plant—measuring it, remodeling old buildings, development of plans for a consolidated school; (4) standard rural schools; (5) problems in the financial support of rural education; (6) consolidation—difficulties, methods, plans for local consolidation surveys; (7) pupil accounting—elimination and retardation in rural schools; an evaluation of New York and other free-tuition and compulsory education laws; (8) a system of records for the rural school administrator; or similar problems according to the needs of the class.

S 20. Administration and Supervision of Vocational Agriculture. Credit, two hours. Daily except Sat., 4.30-6.00. Caldwell Hall 143. Professor WORKS.

This course is designed for persons engaged in the supervision of vocational agriculture or those planning to enter such work. It deals with administration and supervision of agricultural education under the Vocational Education Act; State legislation; related Federal legislation; curricula. Visits to schools in New York and adjacent states are required as a part of the course.

S 21. Supervision of Home Economics. Credit, two hours. Daily except Sat., 11. Home Economics 265. Miss GOODSPEED.

This course is intended for supervisors and for teachers of experience who are preparing for supervisory positions in home economics. The course is concerned with the analysis of the supervisor's work and with methods of supervision. Among the problems presented for study and investigation will be the organization and the administration of homemaking departments; principles underlying the present-day changes in home economics education; principles underlying the organization of courses; evaluation of teaching; improvement of teachers in service; teachers' conferences and study classes.

S 22. Educational Psychology. Credit, two hours. Daily except Sat., 10. Designed for mature students who have had course S 2. Open to others only by permission of instructor. Caldwell Hall 282. Professor KRUSE.

More extended consideration than in course S 2 of such topics as laws of learning; analysis of mental functions; efficiency and improvement; transfer of training in relation to curriculum-making and teaching; distribution of individuals in a single trait and in a combination of traits; measurement of mentality.

S 30. Preparation of Teachers for Rural Elementary Schools. Credit, two hours. Daily except Sat., 11. Caldwell Hall 282. Professor BRIM.

This course is designed for those who are now responsible for the training of rural teachers or who are preparing for such work. The task of the teacher will be briefly analyzed, the present teaching practice and needs examined. A

study will be made of types of preparation offered in different States. The greater part of the time will be given to a consideration of the principal problems in the actual preparation of rural teachers. The following topics are suggested: organizing the ungraded school; content of the rural curriculum; preparation for community leadership; observation and practice teaching as a means of preparation.

S 29. Rural Elementary Curriculum. Credit, two hours. Daily except Sat., 9. Roberts 292. Professor BRIM.

What are the aims and function of elementary education? How is rural elementary education related to rural life? to agriculture? What should be the content of the rural elementary curriculum? How should it differ from an elementary curriculum for urban schools, if at all? How should the course of study be organized to fit the ungraded one-teacher rural school? What change in methods is advisable?

This course is intended not only for those who are to work specifically in this field, but also for any whose work is related to it, such as nature-study specialists, physical trainers, junior project leaders, and principals of elementary schools.

S 33. Supervision of Rural Schools. Credit, two hours. Daily except Sat., 8. Caldwell Hall 282. Professor LUSE.

This course is devoted to a practical consideration of the district superintendent's problems in supervising rural schools. Such topics as the following will form the content of the course: (a) How can the rural schools be organized so as to accomplish the required work? (b) What is a practical daily program for a one-teacher school with eight grades? (c) How can the rural teacher be helped to use the State course of study effectively? (d) By what means can the teachers' initiative and interest in the work be developed? (e) How can standard tests be used as a means of supervision? The experience of the class, the methods and results in other States, and the best suggestions from principles of education will be utilized to develop practical plans of supervision.

S 35. The Making of Courses of Study in Vocational Agriculture. Credit, two hours. Daily except Sat., 10. Caldwell 282. Professor EATON.

The course will consist of problems and discussions of the determination and organization of agricultural content appropriate to regional needs, community needs, and pupil's needs in secondary schools professing vocational objectives in agriculture.

S 45. The Theory of Vocational Education. Credit, two hours. Daily except Sat., 12. Caldwell Hall 282. Professor EATON.

The course consists of discussions of questions developing the social, economic, philosophical, and psychological implications of a publicly maintained system of vocational education.

S 63. Elementary Science in the High School. Credit, one hour. Lectures M W, 11. Mr. BEAMAN.

This course is designed to help high school science teachers in the organization of their material, to help them to know how to introduce scientific ideas to high school students, and to point out to teachers useful sources of information and supply. Only high school science teachers or students who have had Nature Study S 1 are eligible.

RURAL ENGINEERING

[S 5. **Farm Mechanics.** Credit, three hours. Lectures, daily except Sat., 9. Caldwell Hall 143. Laboratory, T Th, 2-5. Farm Mechanics Laboratory.

A study of the applications of machine motions as illustrated in mowers, grain binders, gas engines, and other farm machinery. The selection, installation, care, and use of pumps, water systems, and internal combustion engines. Laboratory exercises will include rope work and belt lacing.] Not given in 1922.

[S 22. **Farm Engineering.** Credit, four hours. Lectures, daily except Sat., 12. Caldwell Hall 143. Laboratory, M W F. Farm Mechanics Laboratory.

A study of leveling instruments and leveling as applied to drainage; elements of plane surveying; the use of concrete and wood in farm buildings; construction and design of farm buildings, including the general-purpose barn, dairy barn, sheep and hog barn, and others as time permits; ventilation, light, and sanitation, with outside problems.] Not given in 1922.

S 41. **Farm Shop Work.** Credit, one or two hours. Open to all teachers of vocational agriculture. Two sections; T and Th, 2-5, and Sat. morning; W and F, 2-5 and Sat. morning. Farm Mechanics Laboratory. Assistant Professor BEHREND.

A course in farm woodwork and correlated drawing; selection and care of tools; harness-repairing; soldering; and farm metal working to prepare men to handle the general farm shop work of the vocational course in agriculture.

S 51. **Drawing.** Credit, one or two hours. Laboratory and practice periods by appointment to suit schedule of students. Drafting room open, M T W Th, 2-4.30. Assistant Professor REYNA.

A course that may cover mechanical, architectural, perspective, or asometric drawing or lettering as required to meet the needs of trade and industrial school teachers. The needs of every student will be individually considered and the work for each will be selected to improve his training on those points where he has in actual teaching encountered difficulties.

RURAL SOCIAL ORGANIZATION

S 1. **The Social Problems of Rural Communities.** Credit, two hours. Lectures, reports, and discussions, daily except Sat., 8. Roberts Hall 292. Professor SANDERSON.

An introductory study of the social problems of rural communities as a basis for the social organization of rural life. Students will make individual studies of selected communities.

S 3. **The Organization of Agriculture in the United States.** Credit, one hour. T Th S, 10. Stone Hall 192.

A discussion of the organization of the agricultural work of the Federal, State, and county governments, and of farmers' organizations.

S 4. **Elementary Sociology.** Daily except Sat., 10. G. S. 124. Professor WOLFE.

An outline introduction to some of the more important concepts and principles of contemporary sociological thought. Mainly a discussion course. Text, Ross, *Principles of Sociology*.

S 5. The Rural Community. Credit, two hours. A seminary course primarily for graduate students. Prerequisite, course S 1 and Economics 55a and 55b or the equivalent. Daily except Sat., 10. Animal Husbandry Building 31. Professor SANDERSON.

S 16. The Place of Play in the Community. Credit, one hour. Lectures, reports, and discussions, T Th S, 9. Roberts Hall 202. Mr. WHITNEY.

The history of play, including pre-human play, the play of primitive peoples, play in ancient, medieval, and modern times; growth of the playground movement; types of present-day play and recreation; types of organizations for play and recreation, private, commercial, and municipal or state-supported; the modern play leader, qualifications, training, duties, and opportunities.

S 17. The Social Value of Play. Credit, one hour. Lectures, reports, and discussions, T Th S, 11. Roberts Hall. Mr. WHITNEY.

The various theories of play; play and individual development; the social point of view; play as a factor in social training; play and social control; play and curricular education; aesthetic influence of play; the play group as a social institution.

VEGETABLE GARDENING

S 1. Vegetable Gardening. Credit, one hour. Lectures, M W F, 8. Poultry Building, Room 325. Laboratory, F, 9-12. Vegetable greenhouses and gardens. Assistant Professor SCHNECK.

This is an introductory course in home vegetable gardening or school gardening work of value to those interested in the teaching of vegetable gardening in secondary schools. The course consists of studies of the principles and practices of gardening as applied to the production, harvesting, and storing of vegetables.

Planning and management of the garden, seed and seed-handling, growing early plants, special requirements of the various vegetable crops and insects and diseases will receive consideration. Laboratory exercises are planned to show application of principles discussed in the lectures. This course should be of aid to teachers of nature study and also to teachers in agricultural high schools.

S 2. Advanced Vegetable Gardening. Credit, one hour. Lectures, T Th, 11. Laboratory, one field trip a week, time to be announced. Poultry Building, Room 325 and vegetable gardens. Assistant Professor SCHNECK.

This course is intended for students who have had experience in vegetable production or handling and who desire to secure more knowledge of the scientific principles underlying the production and handling of vegetables.

The aim in this course is to show the application of fundamental sciences such as chemistry and botany to the production and handling of vegetables. It should be of special value to high school science teachers as a means of helping them to introduce scientific ideas to high school students in connection with vegetable gardening. It is also of value to students in home economics as a means of indicating the importance of vegetable food in the diet and the best methods of selecting and handling different kinds of vegetables for quality.

The field trips will be taken to the College gardens where experiments with vegetables will be studied and also to the best vegetable farms in the vicinity of Ithaca.

S 3. Systematic Vegetable Gardening. Credit, one hour. Lectures and laboratories, M W, 2-5. Vegetable Gardens, East Ithaca.

This course should be of value to teachers of agricultural botany as well as to those interested in agricultural high school teaching.

Lectures on the origin, history, and botany of vegetables; lecture and laboratory studies of different vegetable types and varieties: their characteristics and adaptability to different conditions. Important varieties of all the different vegetables are grown in the gardens, giving an abundance of material for study as well as for preparing and judging exhibits.

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This series of pamphlets is designed to give prospective students and other persons information about Cornell University. No charge is made for the pamphlet unless a price is indicated after its name in the list below. Requests for pamphlets should be addressed to the Secretary of the University at Ithaca. *Money orders should be made payable to CORNELL UNIVERSITY.*

The prospective student should have a copy of the
General Circular of Information

and a copy of one or more of the following Announcements:

Announcement of the College of Arts and Sciences

Announcement of the College of Engineering.

Announcement of the College of Law.

Announcement of the College of Architecture.

Announcement of the New York State College of Agriculture.

Announcement of the Winter Courses in the College of Agriculture

Announcement of the Summer Term in Agriculture.

Announcement of the New York State Veterinary College.

Announcement of the Department of Chemistry.

Announcement of the Graduate School.

Announcement of the Summer Session.

Program of the Annual Farmers' Week

Annual Report of the President.

Special departmental announcements, a list of prizes, etc.

Other periodicals are these:

The Register, published annually in September, and containing, not announcements of courses, but a comprehensive record of the University's organization and work during the last year. Price, 50 cents.

Guide to the Campus. Illustrated. Price, 50 cents.

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The *Announcement of the Medical College* may be obtained by addressing the Cornell University Medical College, Ithaca, N. Y.

Correspondence regarding the Cornell University Official Publication should be addressed to

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